

# HITACHI

Model V-1050

Oscilloscope

**SERVICE MANUAL**

 **Hitachi Denzhi, Ltd.**

TOKYO, JAPAN

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## 1. SPECIFICATIONS

### o CRT

#### Type

Hitachi 150BNB31 rectangular mesh type tube with 20 KV acceleration potential and metal backed phosphor

#### Screen type

P31 phosphor standard

#### Useful screen area

8 × 10 div (div = 10mm)

#### Graticule

Internal graticule with centimeter divisions and 2mm subdivisions along the central axis 10% and 90% lines are indicated. Illumination continuously variable.

#### Focussing

Possible (with automatic focus correction circuit)

|                |         |
|----------------|---------|
| Trace rotation | Present |
|----------------|---------|

|                    |          |
|--------------------|----------|
| Scale illumination | Variable |
|--------------------|----------|

|                       |          |
|-----------------------|----------|
| Brightness adjustment | Possible |
|-----------------------|----------|

### o Z-AXIS

DC-coupled, positive-going signal decreases intensity: 5Vp-p signal causes noticeable modulation at normal intensity: DC to 3.5MHz.

|                 |                        |
|-----------------|------------------------|
| Input impedance | Approximately 15 k ohm |
|-----------------|------------------------|

|                       |                     |
|-----------------------|---------------------|
| Maximum input voltage | 20 V (DC + AC peak) |
|-----------------------|---------------------|

|          |    |
|----------|----|
| Coupling | DC |
|----------|----|

### o VERTICAL DEFLECTION (2 Identical Channels)

#### Bandwidth and Rise time

DC to at least 100MHz and rise time 3.5ns or less. DC to

at least 5MHz and rise time 70ns or less at magnifier extends. Lower -3dB point, AC coupling 10Hz or less.

#### Deflection Factor

5mV/div to 5V/div in 10 calibrated steps, 1-2-5 sequence. Uncalibrated continuous control extends deflection factor to at least 12.5 Volts per division in the 5 Volts/div position.  $\times 10$  magnifier increases sensitivity of each deflection factor setting to 500  $\mu$ V/div.

#### Accuracy

$\pm 2\%$  ( $+10^{\circ}\text{C}$  to  $+35^{\circ}\text{C}$ )

$\pm 4\%$  ( $0^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ )

Additional error for magnifier  $\pm 1\%$

#### Display modes

CH1, CH2 (normal or invert), Alternate, Chopped (250kHz rate), Added

#### Input Impedance

1M ohm  $\pm 1.5\%$  in parallel with 28pF  $\pm 3$ pF.

#### Maximum Input Voltage

250V (DC + AC peak) or 500Vp-p AC at 1KHz or less

#### Input coupling

AC-GND-DC

#### Delay Line

Permits viewing leading edge of display waveform.

#### Four-trace Display (TRIG VIEW)

Display simultaneously channel 1, Channel 2, Channel 3 (A EXT TRIG signal), Channel 4 (B EXT TRIG signal).

The deflection factor of Channel 3 and Channel 4 is approximately 200 mV/div.

|                |   |
|----------------|---|
| Sensitivity    | INT: 1/1 $\pm$ 30% of screen area   |
|                | EXT: 0.2 V/div $\pm$ 30%  |
| Frequency band | EXT: DC to 70 MHz (-3dB)  |
| Position       | CH3: Horizontal 100% graticule line of screen $\pm$ 1div (trigger level knob is set at the center). |
|                | CH4: Horizontal 0% graticule line of screen $\pm$ 1div.   |

## o HORIZONTAL DEFLECTION

### Time Base A

20ns/div to 0.5s/div in 23 calibrated steps, 1-2-5 sequence.  
Uncalibrated continuous control extends deflection factor to at least 1.25 seconds per division in the 0.5 sec/div position. x10 mag extends fastest sweep rate to 2ns/div.

### Time Base B

20ns/div to 50ms/div in 20 calibrated steps 1-2-5 sequence.  
x10 mag extends fastest sweep rate to 2ns/div.

### Accuracy

$\pm$ 2% (+10°C to +35°C)

$\pm$ 4% (0°C to +50°C)

Additional error for magnifier  $\pm$ 2%

### Horizontal Display Modes

A only, A intensified, Alternate, B delayed, X-Y operation.

|                                   |                                |
|-----------------------------------|--------------------------------|
| Delayed sweep position adjustment | 1 div or less ~ 10 div or more |
|-----------------------------------|--------------------------------|

|                      |         |
|----------------------|---------|
| Delay sweep variable | Present |
|----------------------|---------|

|                   |                      |
|-------------------|----------------------|
| Delay Time Jitter | Better than 1:20,000 |
|-------------------|----------------------|

## o TRIGGERING A AND B

### A Trigger Modes

Automatic, Normal, Single sweep, TV (TV-H or TV-V)

A Trigger Hold-off

Adjustable control permits a stable presentation of repetitive complex waveform.

A Trigger Source

Internal (Ch1, Ch2), Line, External, External  $\div 10$

A Trigger Slope

+ or -

TV Sync Polarity

TV(+) or TV (-)

Triggering level  
variable range

For both A and B. Internal; +4div or more  
External; approximately +1V  
External  $\div 10$ ; approximately +10V

Triggering sensitivity and frequency

For both A and B. However, ( ) is only for B

| Frequency        | Internal | External | External $\div 10$ |
|------------------|----------|----------|--------------------|
| DC(30Hz) ~ 10MHz | 0.3 div  | 50 mV    | 500 mV             |
| 10 MHz ~ 100MHz  | 1.5 div  | 150 mV   | 1.5 V              |

TV-V sensitivity: SYNC section less than 0.7div or 200mV  
AUTO low band : Approximately 30Hz (When Time Base A  
is 20ns/div to 2ms/div)

A Trigger Coupling

AC : 30Hz to full bandwidth

HF REJ: attenuates signals below approximately 4KHz

LF REJ: attenuates signals above approximately 4KHz

DC : 0 to full bandwidth

A External Trigger Input Impedance

1M ohm +20% in parallel with 28pF +6pF (However, setting HF REJ and LF REJ are not included.)

Maximum Input Voltage

250V (DC + AC peak)

500Vp-p AC at 1KHz or less

B Trigger Modes and Source

Automatic, Normal (Ch1, Ch2, External)

B Trigger Slope

+ or -

Trigger Coupling

AC only; 30Hz to full bandwidth

o X-Y OPERATION (CH1; Horiz, CH2; Vert)

Deflection Factor

Same as vertical deflection

Accuracy

Y:  $\pm 2\%$  (+10°C to +35°C),  $\pm 4\%$  (0°C to +50°C)

X:  $\pm 5\%$  (+10°C to +35°C),  $\pm 7\%$  (0°C to +50°C)

Additional error for magnifier  $\pm 2\%$

X-Bandwidth

DC to at least 2MHz

Phase Error

3° or less from DC to 2MHz

o CALIBRATOR

0.5V $\pm 1\%$  Frequency 1kHz $\pm 1\%$  square wave

Rise time 5 $\mu$ s or less

o OUTPUT SIGNALS

A GATE OUT

TTL OUTPUT (74LS00 with OUTPUT series  
resistance 100 $\Omega$ )



TTL OUTPUT (7400 with OUTPUT series  
resistance 100Ω)

- POWER SUPPLY

| VOLTAGE (50/60Hz)    | FUSE |
|----------------------|------|
| 100 V ( 90 ~ 110 V ) | 2A   |
| 120 V (108 ~ 132 V ) | 2A   |
| 220 V (198 ~ 242 V ) | 1A   |
| 240 V (216 ~ 264 V ) | 1A   |

Nominal voltage + 5% at 400Hz

Power supply frequency: 50, 60, 400Hz

Power consumption : Approximately 60W

## ○ ENVIRONMENT

Limit of operation temperature 0°C ~ 50°C

|                             |           |
|-----------------------------|-----------|
| Limit of operation humidity | 35% ~ 85% |
|-----------------------------|-----------|

Rated range of use temperature 10°C ~ 35°C

|                             |           |
|-----------------------------|-----------|
| Rated range of use humidity | 45% ~ 85% |
|-----------------------------|-----------|

Storage and transport -20°C ~ 70°C

## ○ DIMENSION AND WEIGHT

310w × 180h × 410d mm

(12.2w × 7.1h × 16.1d in)

10.2kg (22.5 lbs)

2. COMPOSITION

(1) Model V-1050 oscilloscope unit..... 1

(2) Probe (AT-10AE 1.5)..... 2

(3) Fuse (2A for 100V and 120V set  
or 1A for 220V and 240V set)..... 1

(4) Screw-driver..... 1

(5) Dust proof cover..... 1

(6) Power supply cord..... 1

(7) Operation Manual..... 1

### 3. PREVENTIVE MAINTENANCE

Preventive maintenance, when performed on a regular basis, can prevent instrument breakdown and may improve the reliability of the oscilloscope. The severity of environment to which this instrument is subjected will determine the frequency of maintenance. A convenient time to perform preventive maintenance is preceding recalibration of the instrument.

#### Disassembly

Remove the 4 screws in the top cover of the instrument. Gently separate the top cover from the instrument and lay aside. Most of the internal parts of the instrument are now accessible.

If access to the front of the circuit boards are necessary, remove the knobs from the external control shafts on the board. Remove the two screws securing the side panel to the Input circuit board and remove the instrument side panel. (See 5. DISASSEMBLY ILLUSTRATION.)

#### Cleaning

The instrument should be cleaned as often as operating conditions require. Accumulation of dirt in the instrument can cause component breakdown.

The covers provide protection against dust in the interior of the instrument. Loose dust accumulated on these covers can be removed with a soft cloth or small brush.

Dirt that remains can be removed with a soft cloth depended in a mild detergent and water solution. Abrasive cleaners should not be used.

Cleaning the interior should only be occasionally necessary. The best way to clean the interior is to blow off the dust with a dry, low-velocity stream of air. A soft-bristle brush or a cotton-tipped applicator is useful for cleaning in narrow spaces or for cleaning more delicate components.

## Visual Inspection

The instrument should be inspected occasionally for such defects as broken connections, improperly seated transistors, damaged circuit boards, and heat-damaged parts. The corrective procedure for most visible defects is apparent; however, particular care must be taken if heat-damaged components are found. Overheating usually indicates other trouble in the instrument; therefore, correcting the cause of the overheating is important to prevent recurrence of the damage.

#### 4. CALIBRATION.

Hitachi Denshi, Ltd. provides complete instrument repair and recalibration at our oversea's office, and authorized dealer. Contact your local Hitach Denshi, Ltd. office or representative.

##### 4.1 CALIBRATION INTERVAL

To maintain instrument accuracy, perform the calibration of the V-1050 at least every 1000 hours of operations or every six month if used infrequently.

##### 4.2 TEST EQUIPMENT REQUIRED

The following test equipment and accessories, or equivalent, are required for the complete calibration of the V-1050. The given specifications for the test equipment are the minimum necessary for accurate calibration. Therefore, the specifications of any test equipment used must meet or exceed the listed specifications. All the test equipment is assumed to be correctly calibrated and operating within the listed specification. Operating instructions for the test equipment are not given in this procedure. Refer to the instruction manual for the test equipment if more information is needed.

##### 4.3 PRELIMINARY PROCEDURE

This instrument should be calibrated at an ambient temperature of +20°C (+5°C) for best overall accuracy.

1. Connect the instrument to AC line voltage, 50/60/400 Hz line source.
2. Set the instrument controls as given in the Preliminary Control Settings. Allow at least fifteen minutes of warmup before proceeding.
3. See the Adjustment Locations in the pullout pages.

Table 4-1  
TEST EQUIPMENT REQUIRED

| Description                            | Minimum Specification   | Usage   | Examples of Applicable Test Equipment |
|--|---|---|---------------------------------------|
| 1. Constant Amplitude Signal Generator | 50kHz reference frequency; maximum frequency 150MHz; variable amplitude.                  | Check horizontal, vertical and trigger bandwidth.                       | Hitachi Part No.4202                  |
| 2. Standard Amplitude Calibrator       | Amplitude accuracy: 0.25%, variable amplitude; 5mV to 40 V; frequency: 1 kHz square wave. | Check horizontal and Vertical gain.                                     |                                       |
| 3. Square-wave Generator               | Variable frequency: 10 Hz to 1 MHz; output amplitude; 10 mV to 100 V.                     | Check probe and vertical compensation.                                  |                                       |
| 4. Digital Multimeter                  | 0.1% accuracy.  | Check power supply.   |                                       |
| 5. Digital Frequency Counter           | 0.1% accuracy.  | Check CAL frequency.  |                                       |
| 6. Time Mark Generator                 | 0.1% accuracy .   | Check horizontal timing.  |                                       |
| 7. Cable                               | Impedance, 50 ohms; type, RG-58/U; length, 42 inches, connectors, BNC                     | External trigger operation check. Horizontal gain check and adjustment. |                                       |
| 8. Termination                         | Impedance, 50 ohms; connectors, BNC   | Vertical Amplifier compensation checks and adjustment.                  |                                       |
| 9. Attenuator                          | Ratio, 10X; connectors, BNC; impedance, 50 ohms.  | Vertical Amplifier bandwidth check.                                     |                                       |
| 10. T-Connector                        | Connectors, BNC.  | External trigger operation checks.                                      |                                       |

Hitachi Part No.1301

#### 4.4 PRELIMINARY CONTROL SETTINGS

Preset the instrument controls to the settings given below, when starting the calibration procedures.

| FOCUS                     | Midrange               | <span>FINE</span>    | Midrange                    |
|---------------------------|------------------------|----------------------|-----------------------------|
| TRACE ROTATION            | As desired             | VAR HOLD OFF         | Fully counterclockwise      |
| V. POSITION               | Midrange, push in      | <span>SWP VAR</span> | Fully clockwise,<br>push in |
| V. VARIABLE               | CAL, fully clockwise   | DISPLAY              | A                           |
| AC-GND-DC                 | GND                    |                      | - B TRIG -                  |
| VOLTS/DIV                 | 5mV/DIV                | SOURCE               | AUTO                        |
| V. MODE                   | CH1                    | LEVEL                | Midrange, push in           |
| TRIG VIEW                 | Normal (Button Out)    |                      | - A TRIG -                  |
| INV                       | Normal (Button Out)    | LEVEL                | Midrange, push in           |
| SCALE ILLUM               | Fully counterclockwise | RESET                | Normal                      |
| H. POSITION               | Midrange               | MODE                 | Auto                        |
| <span>PULL X10 MAG</span> | Midrange, push in      | COUPLING             | AC                          |
| TIME/DIV A                | 1mS                    | SOURCE               | CH1                         |
| DLY TIME MULT             | Midrange               |                      |                             |

#### 4.5 INITIAL STARTING PROCEDURE

1. Rotate POWER/INTENSITY control to the midrange.
2. Wait a few seconds for the cathode ray tube (CRT) to warm up. A trace should appear on the display of the CRT.
3. If trace disappears, increase (clockwise) the POWER/INTENSITY control setting until the trace is easily observed, or roughly check/adjust the DC balance to get a trace as same as (15)
4. Adjust FOCUS control for the best focused display.
5. Readjust POSITION controls if necessary, to center the trace.

## POWER SUPPLY SYSTEM

### NOTE

Before you begin, see ADJUSTMENT LOCATIONS in the pullout pages.

### Control Settings

Preset the controls as given in the Preliminary Control Setting.

- ① Check Low-voltage Supply, if necessary
  - a. Connect the digital voltmeter (DVM) from the +12 volt line.  
: +11.975 V to +12.025 V (P1104-3)
  - b. Connect the DVM from the -12 V line  
: -11.75 V to -12.25 V (P1104-5)
  - c. Connect the DVM from the +5V line  
: +4.75 V to +5.25 V (P1104-4)
  - d. Connect the DVM from the +55 V  
: +53 V to 57 V (P1104-2)
  - e. Connect the DVM from the 100 V  
: +98 V to +102 V (P1104-1)
- ② Adjust Low-voltage Supply  
Adjust the adjustment RV1112 for DVM reading of +12V (±0.025V).
- ③ Check High Voltage Supply
  - a. Connect the DVM to the H.V test point (PEF-503-2) by High Voltage Probe.
  - b. Check for a reading of -1870 V ~ -2030 V



## DISPLAY

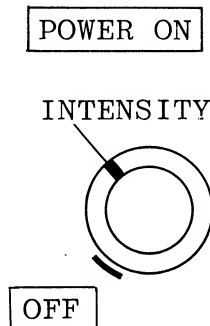
### Control Setting

Preset the controls as given in the Preliminary Control Setting.

#### ④ Check/Adjust CRT Bias

DISPLAY switch to the ☐ A position, and A TIME/DIV switch to the 1 ms.

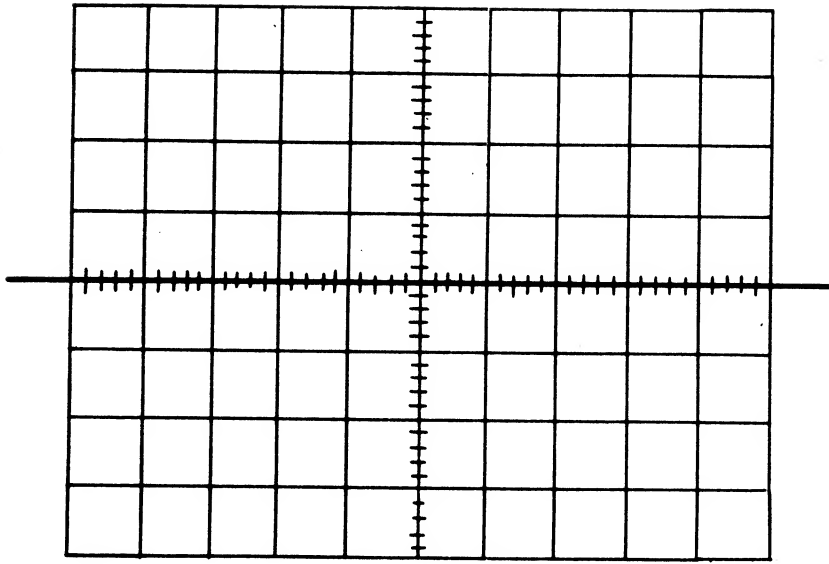
- a. Rotate the POWER/INTENSITY to the "N" letter of the "INTENSITY" as shown.



- b. Observe the trace of CRT.
- c. Adjust Grid Bias Adjustment RV1040 for the trace makes an appear.

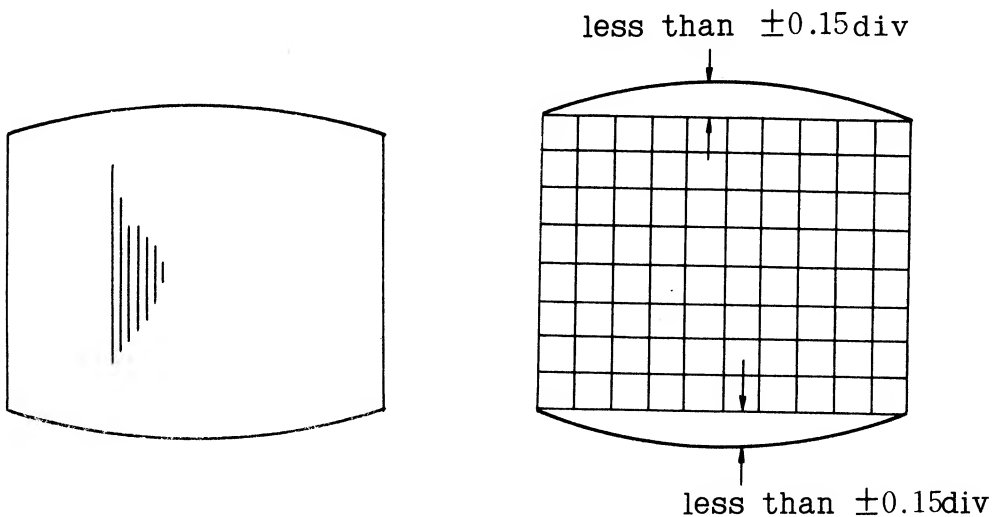
#### ⑤ Check/Adjust Trace Rotation

- a. Check that the trace is parallel to the center horizontal line.
- b. Adjust TRACE ROTATION for a trace that is parallel with the horizontal graticule lines.



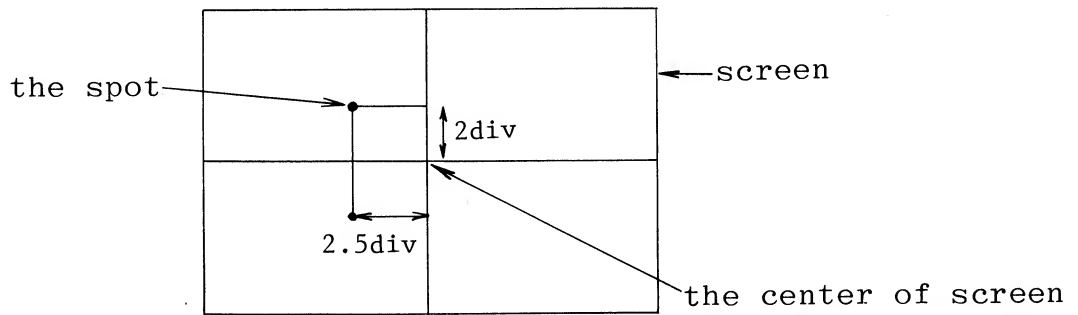
⑥ Check/Adjust GEOMetry

- a. Set the A TIME/DIV switch to the 1mS, and AC-GND-DC to DC.
- b. Connect the Constant Amplitude Signal Generator to the input.
- c. Set the VOLTS/DIV switch setting for a full-screen (8 division) deflection.
- d. Check that horizontal bowing is less than  $\pm 0.15$  division.
- e. Adjust the GEOM adjustment RV1035 for a display that is parallel with top and bottom horizontal lines.



⑦ Check/Adjust ASTIGmatism and FOCUS.

- a. Vertical Mode switch to the CH2 X-Y position, and Display switch to the X-Y position, and AC-GND-DC to DC.
- b. Set the POWER ON INTENSITY control for a small spot, as the following figure, using position controls.



- c. Check that the spot is round.
- d. Adjust the FOCUS adjustment and the ASTIG adjustment RV1038 for a round spot.

HORIZONTAL SYSTEM

Control Settings

Preset the controls as given in the Preliminary Control settings.

⑧ Check/Adjust Delay time

- a. Vertical Mode Switch to the CH1 position.
- b. Set the A TIME/DIV switch to the 1 mS.
- c. Set the B TIME/DIV switch to the 0.5  $\mu$ S.
- d. Set the input AC-GND-DC to DC, connect the cable to the output of the time mark generator, set the time mark generator for 1 mS time marks.
- e. Display switch to the INTEN.
- f. Connect the cable to the output of the time mark generator.
- g. Set the time mark generator for 1 mS time marks.

- h. Set the DELAY TIME MULT dial to 1.00.
- i. Check that intensified portion of the sweep begins at the second time marker (It may be necessary to readjust the INTENSITY control, so that the intensified portion of the sweep is visible.)
- j. Adjust the RV562 so that the intensified portion of the sweep begins at the start of the second time marker.
- k. Set the DELAY TIME MULT dial to 9.00.
- l. Check that intensified portion of the sweep begins at the tenth time marker.
- m. Adjust the RV560 so that the intensified portion of the sweep begins at the start of the tenth time marker.
- n. Repeat both the RV562 and the RV560 adjustments for no visible interaction.

⑨ Check/Adjust Horizontal Gain

- a. DISPLAY switch to the A position.
- b. Check that the time marks align with the graticule lines over the center eight divisions, within 2%.
- c. Adjust H GAIN adjustment RV813 so that the time marks align with the center eight graticule lines.

⑩ Check/Adjust B Sweep Start

- a. Set the input AC-GND-DC to GND.
- b. Set the A TIME/DIV switch to the 2 mS.
- c. Adjust the Position control so that the beginning of the A sweep is coincident with the first vertical graticule line
- d. Set the B TIME/DIV switch to the 1 mS.
- e. DISPLAY switch to the B position.

- f. Check that the beginning of the B sweep is identical with the first vertical graticule line.
- g. Adjust the RV 714 so that the beginning of the sweep is identical with the first vertical graticule line.

⑪ Check/Adjust B Sweep Calibration

- a. Set the input AC-GND-DC to DC.
- b. Check that the time marks align with the graticule lines over the center eight divisions, within 2%.
- c. Adjust B SWEEP CAL adjustment RV742 so that the time marks align with the center eight graticule lines.

⑫ Check/Adjust Horizontal X10 MAG Gain

- a. DISPLAY switch to the A position, set the A TIME/DIV switch to the 1 mS.
- b. Set X10 MAG (Pull out the inner knob of the POSITION control).
- c. Check that the one-cycle time marks align with the ten-divisions graticule lines, within 2%.
- d. Adjust MAG GAIN adjustment RV804 for one-cycle time marks align with the ten-divisions graticule lines.
- e. Push in the inner of the POSITION control after the adjustment and check.

⑬ Check/Adjust MAG CENT

- a. Set the A TIME/DIV switch to the 0.1 mS.
- b. Being the inner shift of H. POSITION is in pulled out state (X10 MAG), the left end of the trace is brought to the center point and then the inner shift of H. POSITION is depressed.
- c. Observe the movement of the left end of the trace.

- d. Adjust the MAG CENT adjustment RV811 for the movement of the left end of the trace within  $\pm 0.2$  div.

⑭ Check/Adjust High speed sweep accuracy

- a. Set the input AC-GND-DC to DC.
- b. Display switch to the A position.
- c. Set the time mark generator for 50 ns time marks.
- d. Set the A TIME/DIV switch to 50 ns.
- e. Check that the time marks align with the graticule lines over the center eight divisions.
- f. Adjust CV530 at that the time marks align with center eight graticule lines.
- g. Display switch to the B position.
- h. Set the A TIME/DIV switch to 0.2  $\mu$ s.
- i. Set the B TIME/DIV switch to 50 ns.
- j. Refer part (e) through (f) (in this case, adjust CV730)
- k. Display switch to the A position.
- l. Set the A TIME/DIV switch to 5  $\mu$ s.
- m. Set the time mark generator for 5  $\mu$ s time marks.
- n. Refer part (e) through (f) (in this case, adjust CV534).
- o. Display switch to the B position.
- p. Set the A TIME/DIV switch to 20  $\mu$ s.
- q. Set the B TIME/DIV switch to 5  $\mu$ s.
- r. Refer part (e) through (f) (in this case, adjust CV 734).
- s. Display switch to the A position.
- t. Set the A TIME/DIV switch to 20 ns.
- u. Set the time marks generator for 20ns time marks.

- v. Refer part (e) through (f) (in this case, adjust RV540).
  - w. Display switch to the B position.
  - x. Set the A TIME/DIV switch to 50 ns
  - y. Set the B TIME/DIV switch to 20 ns.
  - z. Refer part (e) through (f) (in this case, adjust RV740).
  - α. Check all other ranges of timing within 2%.
- Use appropriate settings on the time mark generator.

## VERTICAL SYSTEM

### Control Setting

Preset the controls as given in the Preliminary Control Settings.

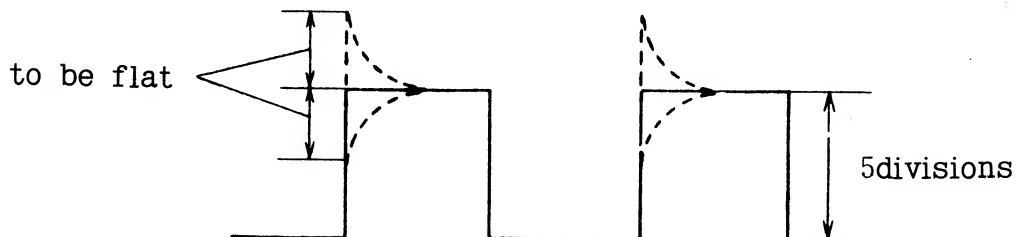
- ⑮ Check/Adjust DC Balance (Step attenuator balance).
  - a. Set the VOLTS/DIV switch to the 5mV position.
  - b. Position the trace to the horizontal center line.
  - c. Change the VOLTS/DIV switch to the 10mV position.
  - d. Check that the trace is within 0.1 division of the center horizontal line.
  - e. Adjust the CH1 (CH2) DC BAL adjustment, RV7 (CH1) or RV107 (CH2), for a trace at the horizontal center line (DC BAL adjustment RV7 and RV107 are possible to adjust at the adjusting point on the front panel.)
  - f. Repeat part (a) through (e) until less than 0.1 division shift is noted when changing the VOLTS/DIV setting.
- ⑯ Check/Adjust Vertical Position Center.
  - a. Confirm the vertical POSITION control at the midrange.
  - b. Check the trace is within 1 division.
  - c. Adjust the Position Center adjustment RV73 (CH1), RV173 (CH2) for a trace at the horizontal center line.

⑪⑦ Check/Adjust ADD BALANCE

- a. Set the A TIME/DIV to the 1ms position, the Display switch to A.
- b. Set the CH1 and CH2 AC-GND-DC switchs to GND.
- c. Set the V MODE switch to CH1.
- d. Adjust the vertical Position control that the trace is identical with the center horizontal graticule line.
- e. Next, set the V MODE switch to CH2 and adjust the vertical Position control that the trace is identical with the center horizontal graticuls line.
- f. Set the V MODE switch to ADD.
- g. Check that the trace is identical with the center horizontal graticule line within  $\pm 0.5$  division.
- h. Adjust ADD BAL adjustment RV327 for two times of the difference with the center horizontal graticule line.

⑪⑧ Check/Adjust X1 AC GAIN

- a. Set the A TIME/DIV switch to the 1mS position.
- b. Set the VOLTS/DIV switch to the 10mV position.
- c. Set the AC-GND-DC switch to DC.
- d. Connect the square-wave generator (using 1KHz out put range).
- e. Adjust the output amplitude of that generator for 5 division deflection of screen.
- f. Check the high-voltage level of pulse is flat.





g. Adjust the X1 AC GAIN RV33(CH1), RV133(CH2) adjustment for a flat level.

①9 Check/Adjust Vertical Gain.

- a. Set the A VOLTS/DIV switch to the 10mV position and AC-GND-DC switch to DC.
- b. Connect the standard amplitude calibrator to the input.
- c. Set the standard amplitude calibrator for a 50mVp-p (5 divisions of display) signal.
- d. Check for a display of five divisions.
- e. Adjust GAIN adjustment RV339(CH1), RV160(CH2) for a display of 5 divisions within 2%.
- f. Check all the VOLTS/DIV switch settings.

②0 Check/Adjust Input Capacity (ATT: ÷1).

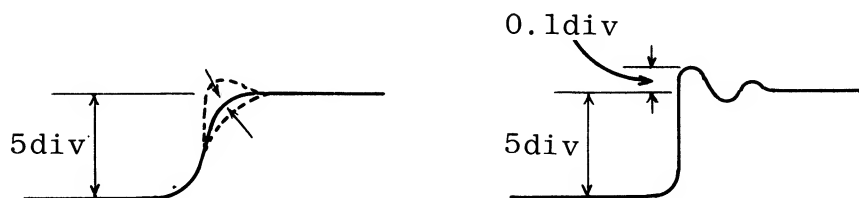
- a. Set the VOLTS/DIV switch to 10mV position.
- b. Set the AC-GND-DC switch to DC.
- c. Connect the L-C meter to the input terminals.
- d. Check the input capacity for approximately 28 pF.
- e. Adjust CV3(CH1), CV103(CH2) for a 28 pF input capacity.

②1 Check/Adjust Vertical Step Response

- a. Set the VOLTS/DIV switch to the 10mV position.
- b. Set the A TIME/DIV switch to the 20 ns position.
- c. Connect the fast-rise, positive output (50mV, 1kMz) of the square-wave generator to the input. Use a 50-ohm termination and cable.
- d. Set the square-wave generator to 1MHz. Adjust the square-wave generator output for a 5-divisions display.

e. CH1 - Set CV63 and RV63 to the midposition. And adjust CV325, CV342 and CV344 for a square wave that is flat. Then, adjust CV63 and RV63 for over-shoot that is +0.1 div.

CH2 - Adjust CV163 and RV163 for over-shoot that is +0.1 div.



## ②② Check/Adjust Attenuation Compensation

(ATT :  $\div 10$ ,  $\div 100$ ,  $\div 250$ )

- Set the AC-GND-DC switch to DC.
- Connect the square-wave generator to the CH1 (CH2) input terminal check for a square wave that is flat (flat top) under the following settings.

| ATT        | VOLT/DIV | The squarewave generator output |
|------------|----------|---------------------------------|
| $\div 10$  | 50mV     | 0.25V                           |
| $\div 100$ | 0.5V     | 2.5 V                           |
| $\div 250$ | 5 V      | 25 V                            |

- Adjust the trimmer condensers (refer the circuit board illustration with adjustment location - page 37) for a squarewave that is flat (flat top) under the following settings.

| ATT        | VOLT/DIV | The squarewave generator output | Adjust CH1 (CH2) |
|------------|----------|---------------------------------|------------------|
| $\div 10$  | 50mV     | 0.25V                           | Comp-1/10        |
| $\div 100$ | 0.5V     | 2.5 V                           | Comp-1/100       |
| $\div 250$ | 5 V      | 25.0V                           | Comp-1/250       |

- ②③ Check/Adjust Input Capacity (ATT:  $\div 10$ ,  $\div 100$ ,  $\div 250$ )
- Connect the L-C meter to the Input terminal.
  - Check the Input capacity for a approximately 28pF.
  - Adjust the trimmer condensers for a 28pF Input capacity under the following settings.

| ATT        | VOLTS/DIV | Adjust CH1 (CH2) |
|------------|-----------|------------------|
| $\div 1$   | 10mV      | Cin - 1/10       |
| $\div 10$  | 0.1V      | Cin - 1/100      |
| $\div 100$ | 1 V       | Cin - 1/250      |

#### TRIGGERING SYSTEM

- ②④ Check/Adjust A TRIG CENT
- Set A TRIG SOURCE switch to CH1, A TRIG COUPLING switch to AC, A TRIG SLOPE knob push in, the VOLTS/DIV switch to 10mV, the A TIME/DIV switch to 20 $\mu$ s.

- b. Connect the sine-wave generator to the input for a 0.3div (50kHz).
- c. Set A TRIG LEVEL knob to the midposition.
- d. Adjust RV441 so that synchronization is effected on the waveform, 0.3div on the screen.
- e. Under the state of (d), if synchronization is not effected by switching A TRIG COUPLING to "DC", set CH1(CH2) DC LEVEL adjustment RV211 (CH1) and RV311(CH2) so that synchronization is effected.
- f. Next, set A TRIG SLOPE to -(pulled out state) and insure that synchronization is effected. After confirmation, leave A TRIG-SLOPE in depressed state. Readjust when stepped out.

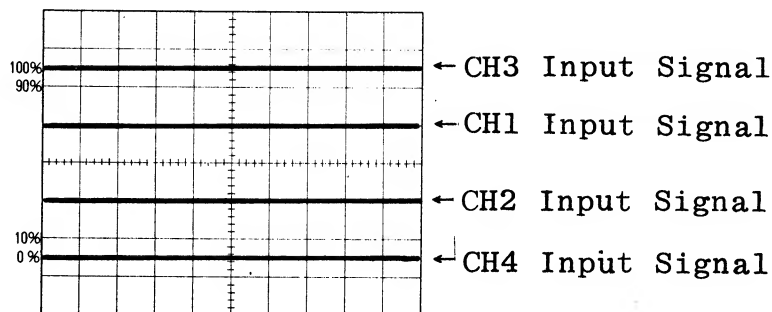
②⑤ Check/Adjust B TRIG CENT

- a. Set A TRIG SOURCE switch to CH1, B TRIG SLOPE knob push in, the B TIME/DIV switch to 5 $\mu$ s. Set the DISPLAY switch to INTEN.
- b. Set B TRIG LEVEL knob to the midposition.
- c. Check for the intensified portion of the sweep.
- d. Adjust RV622a so that the intensified portion of the sweep appears. (Synchronization is effected).
- e. Next, set B TRIG slope to -(pulled out state) and insure that synchronization is effected. After confirmation, leave B TRIG-SLOPE in depressed state. Readjust when stepped out.

②⑥ Check/Adjust TRIG VIEW Position

- a. Set the A TIME/DIV switch to the 1mS.
- b. Set the V MODE switch to ALT (or CHOP).
- c. Push the TRIG VIEW button in.

- d. Set the A TRIG LEVEL knob to the midposition.
- e. Observe the four-trace display (CH1, CH2, CH3: A TRIG signal, CH4: B TRIG signal).
- f. Check that the CH3 trace is identical with the horizontal 100% graticule line and the CH4 trace is identical with the horizontal 0% graticule line.
- g. Adjust the A POS adjustment RV231 so that the CH3 trace comes to the +1 div on the 100% graticule line.
- h. Adjust the B POS adjustment RV249 so that the CH4 trace comes to the +1 div on the 0% graticule line.



- 27 Check/Adjust CH3 (A EXT TRIG) and CH4 (B EXT TRIG)
  - a. Set the A TRIG SOURCE switch to the EXT position, the A COUPLING switch to the DC point, the A MODE switch to the AUTO position, the B TRIG SOURCE switch to the EXT position, and push the TRIG VIEW button in.
  - b. Connect the square-wave generator (using 1kHz out put range) to CH3 (A EXT TRIG) and CH4 (B EXT TRIG) terminal. Use a 50-ohm termination and cable.
  - c. Check the high-voltage level of pulse is flat.
  - e. Adjust CV423 (CH3), CV603 (CH4).

## ②⑧ X-Y Operation

### ②⑧-① Check/Adjust X Gain.

- a. Set the vertical MODE switch to CH2 X-Y, the DISPLAY switch to X-Y, the AC-GND-DC switch of CH1 to DC, the AC-GND-DC switch of CH2 to GND.
- b. Set the VOLTS/DIV switch to the 10mV position, with X1 GAIN.
- c. Connect the standard amplitude calibrator to the CH1 input.
- d. Set the standard amplitude calibrator for a 50mV.
- e. Check for a display of five divisions.
- f. Adjust the X GAIN adjustment RV783a for a display of five divisions within 3%.

### ②⑧-② Check/Adjust X Position Center

- a. Set the DISPLAY switch to X-Y position, the vertical MODE switch to CH2/ X-Y position and the horizontal POSITION control to the midposition, the AC-GND-DC switch of CH1 to GND.
- b. Check to see that round spot is near the center graticule and is within 0.2 division against horizontal line.
- c. Adjust the X CENT adjustment RV208 to position spot at the center.

### ②⑧-③ Check/Adjust X-Y phasing

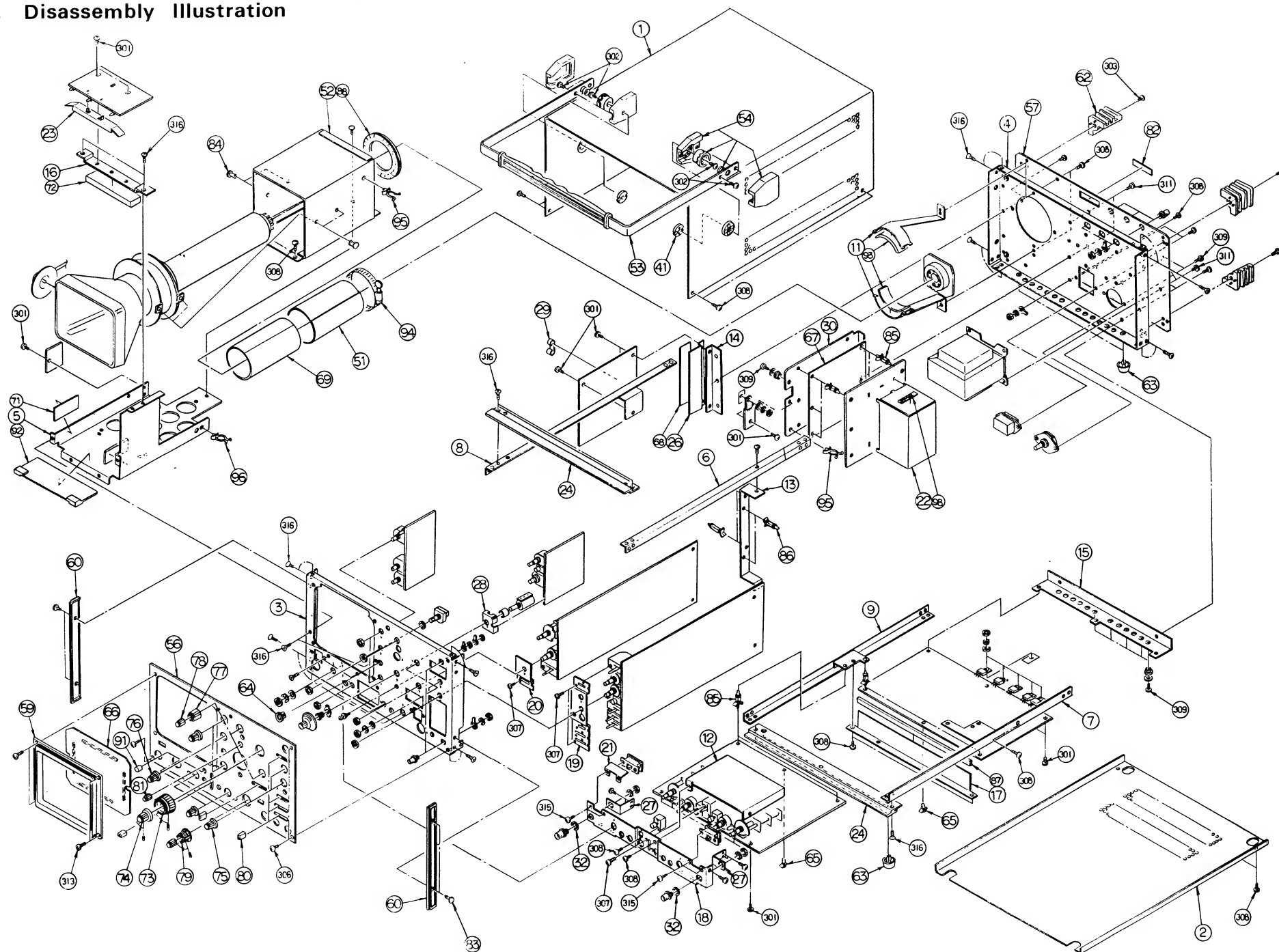
- a. Set the AC-GND-AC switch of CH1 and CH2 to DC.
- b. Connect the constant amplitude signal generator to the CH1 and CH2 inputs through 500 $\Omega$  BNC cable, 500 $\Omega$  BNC termination.
- c. Adjust the constant amplitude signal generator for an eight division horizontal display of 1MHz.

- d. Center the display vertically and horizontally with the CH1 and CH2 POSITION controls.
- e. Check CRT display for an opening at the center horizontal line of 0.4 division or less.
- f. Adjust CV782A so that the opening at the center horizontal line becomes to 0 division.
- g. Adjust the constant amplitude signal generator for eight division horizontal display of 2MHz, confirm CRT display for an opening at center horizontal line 0.4 division or less.

#### CALIBRATOR

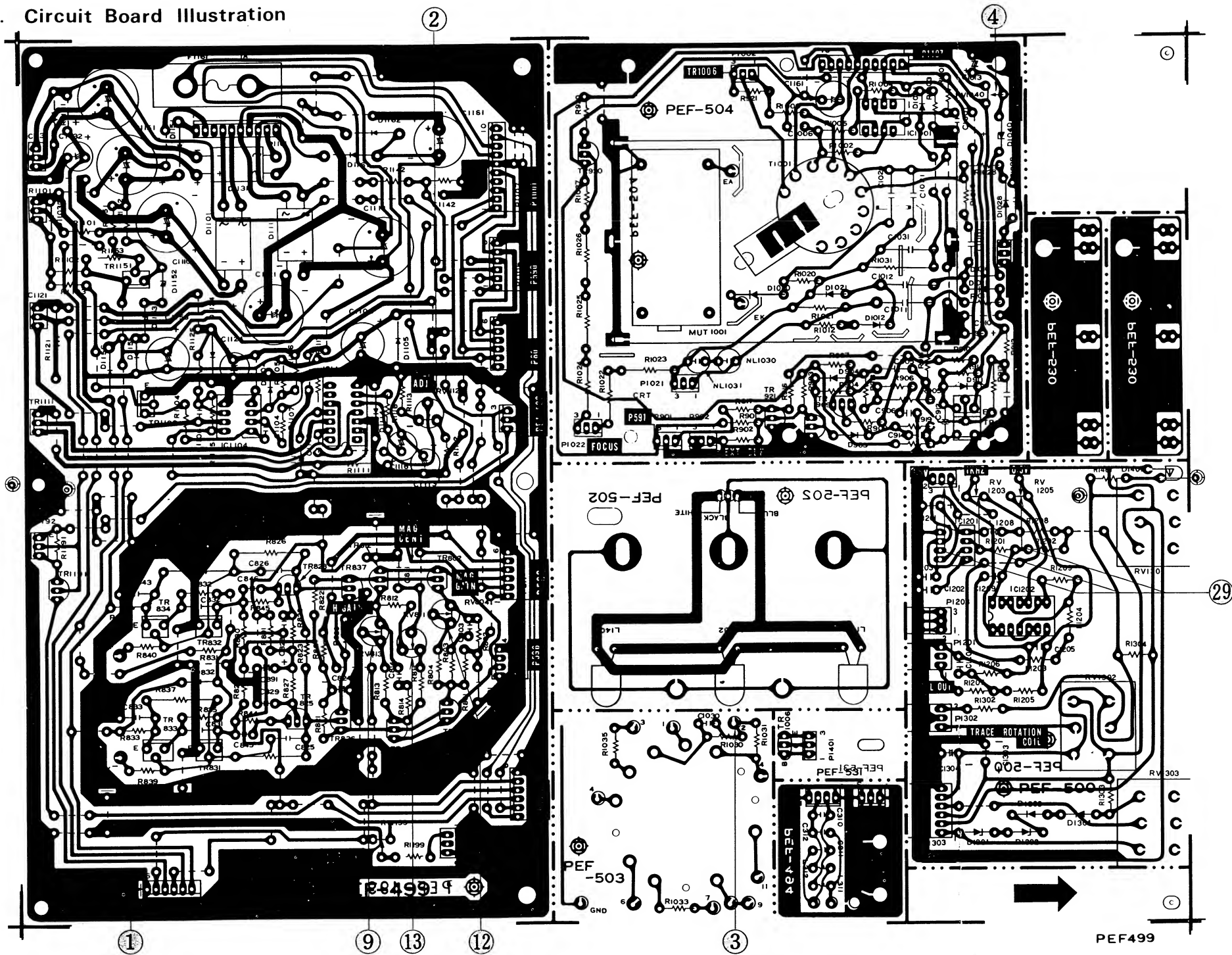
- ②9 Check/Adjust CAL terminal (0.5Vp-p, 1KHz)
  - a. Connect the CAL terminal to the Digital frequency counter.
  - b. Check for the CAL frequency of 1KHz, within 1%.
  - c. Adjust the 1KHz adjustment RV1203 for the CAL frequency of 0.99 to 1.01 KHz.
  - d. Next, connect the CAL terminal to the Digital Multimeter, short the terminal 1 to 3 of the connector (Pl202).
  - e. Check for the CAL output of 0.5V, within 1%.
  - f. Adjust the 0.5V adjustment RV1205 for the CAL output of 0.495 to 0.505 Volt.

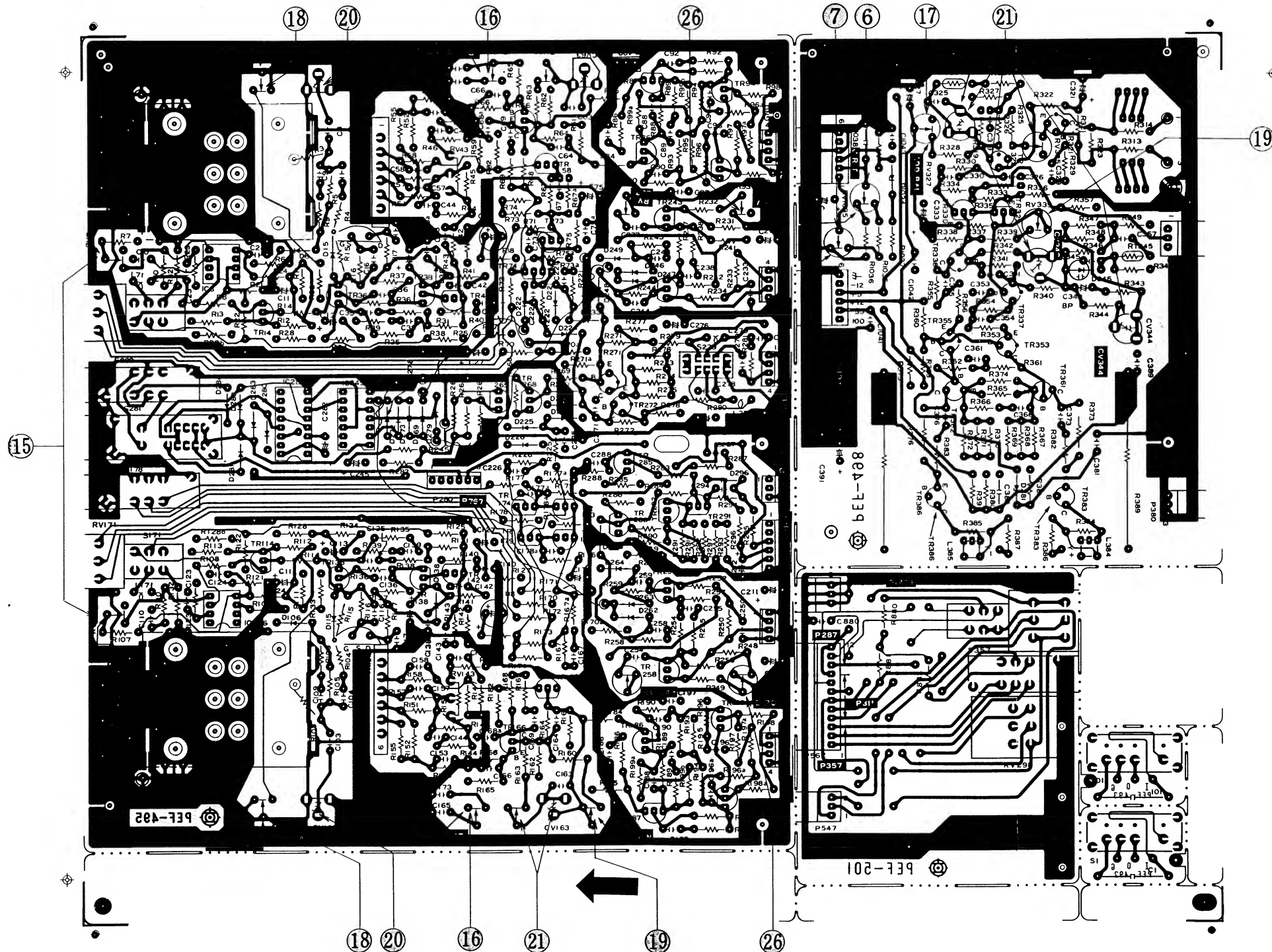
## 5. Disassembly Illustration

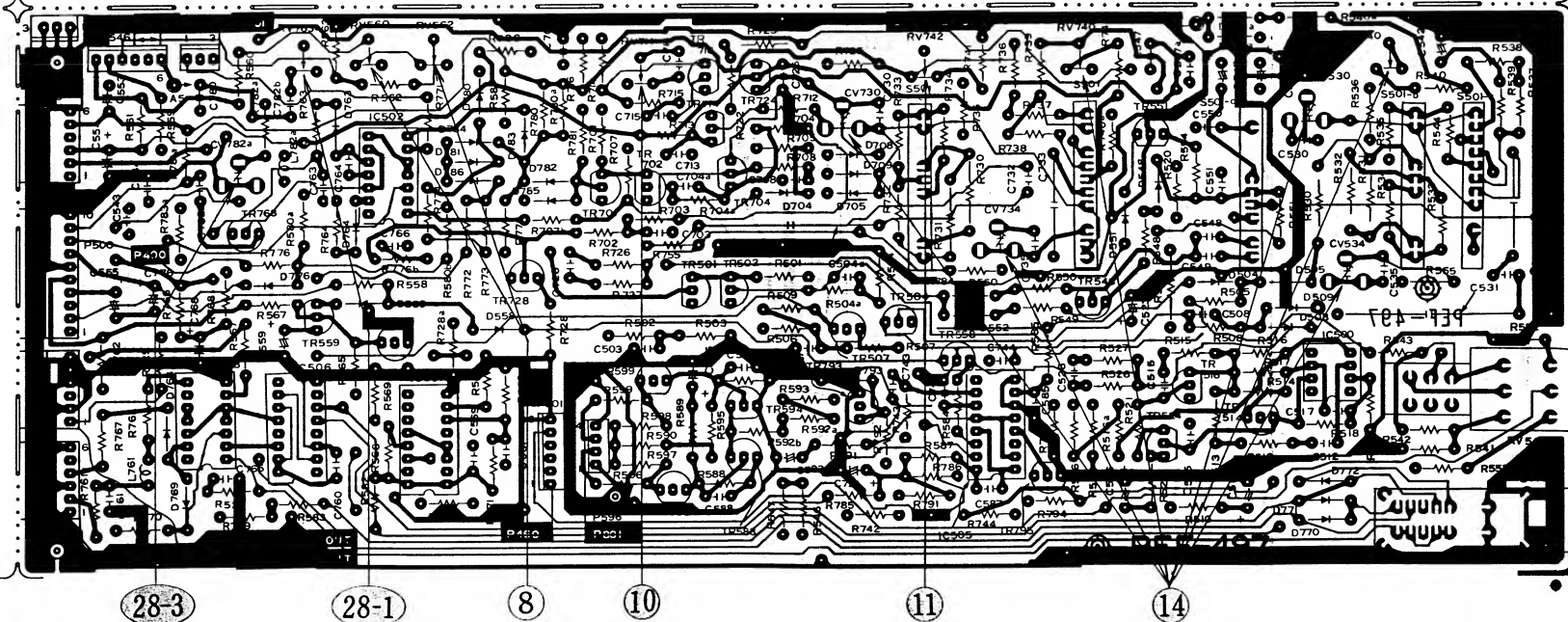
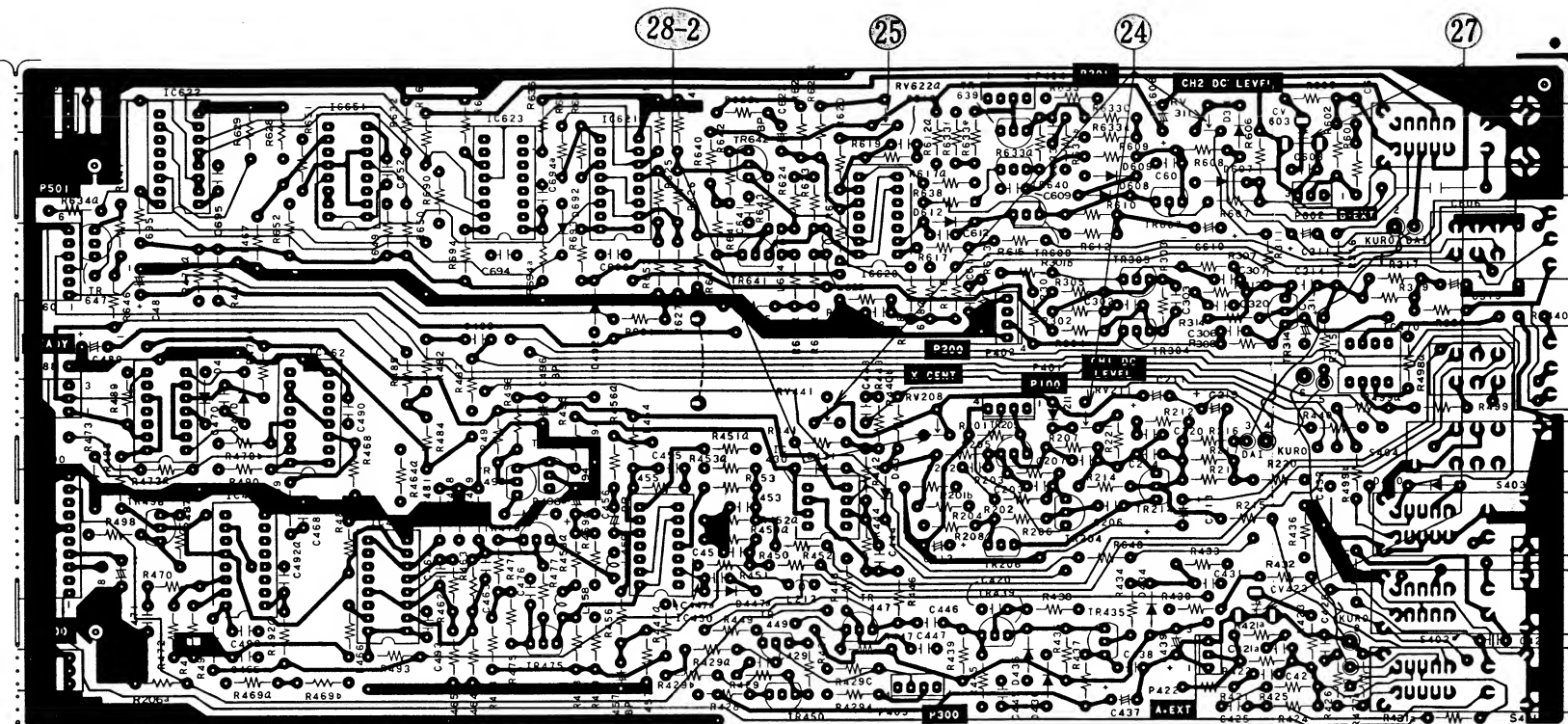


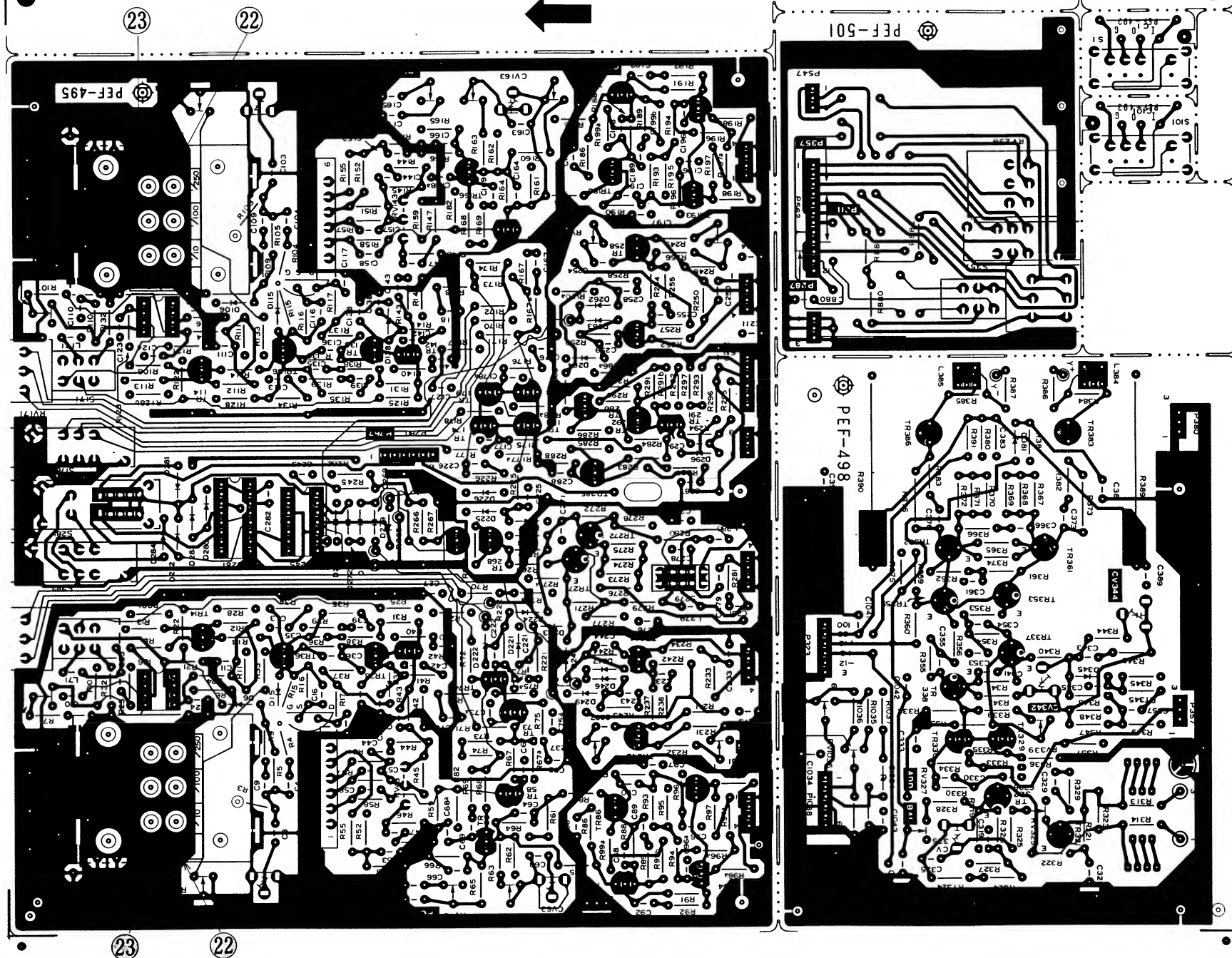


## 6. Circuit Board Illustration



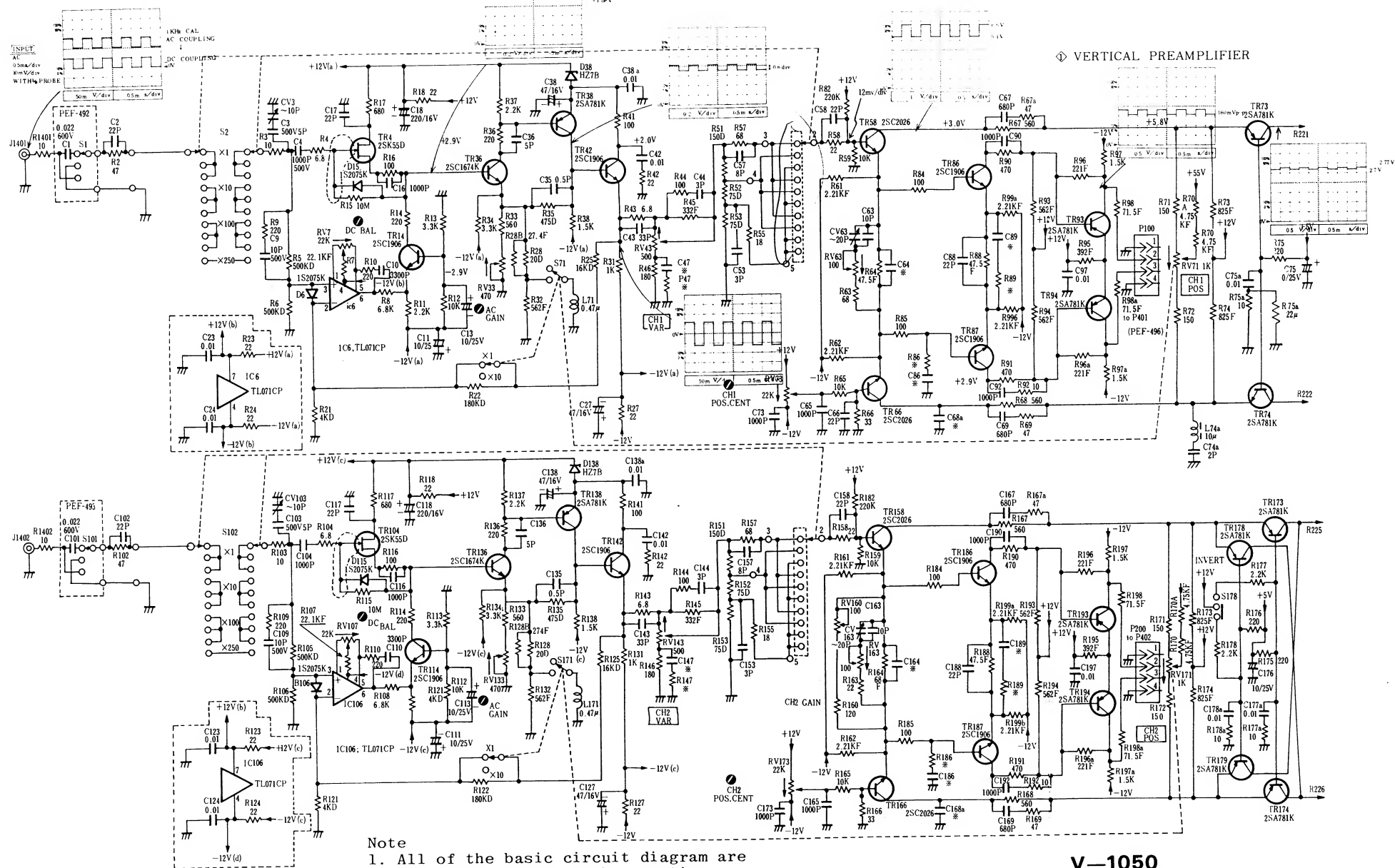









## 7. Diagram

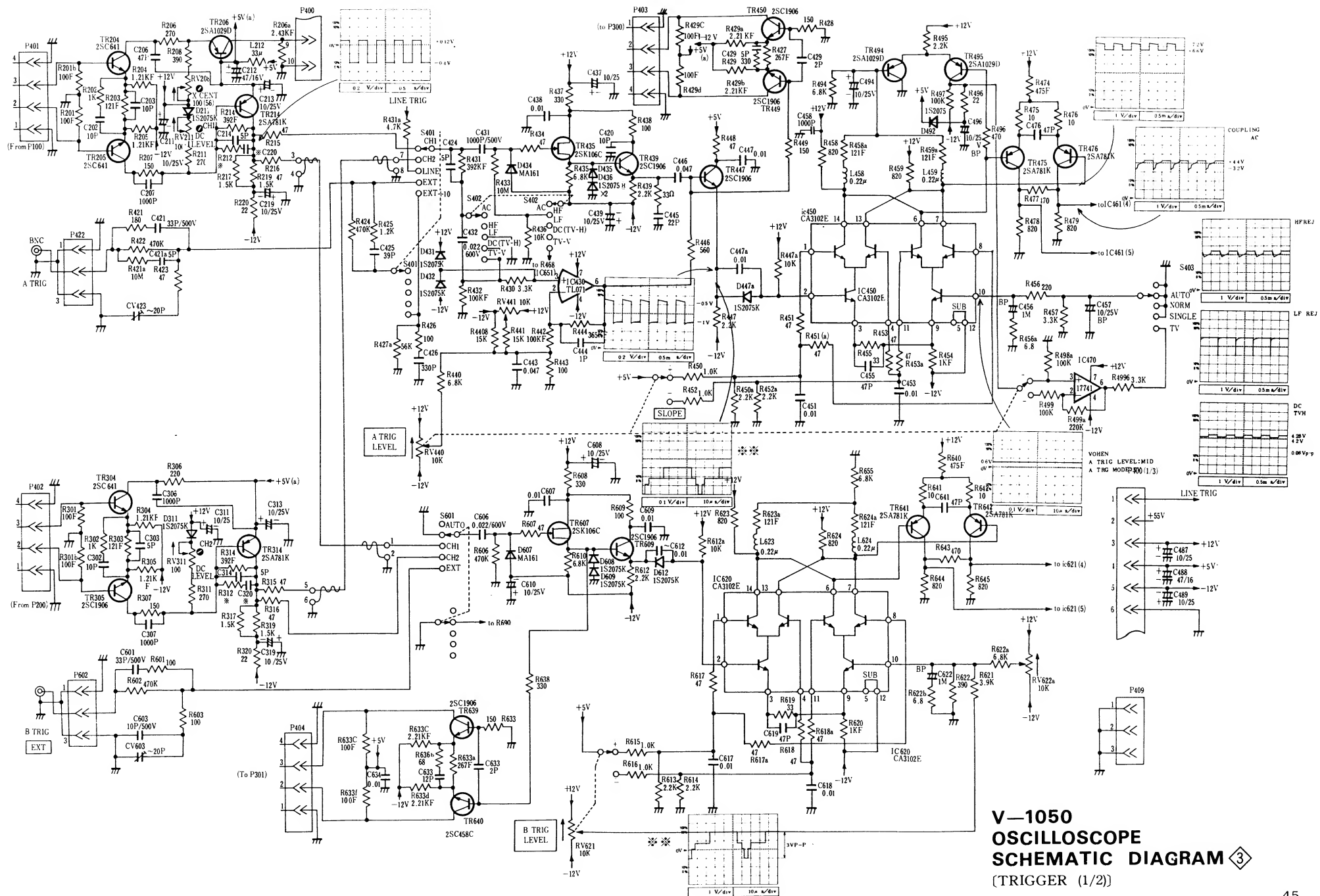


### Note

1. All of the basic circuit diagram are subject to change without notice.
2. All resistor values in ohm: 1/4W and all capacitor values in micro farad unless indicated.
3. \* Factory selected values.

**V—1050**  
**OSCILLOSCOPE**  
**SCHEMATIC DIAGRAM**   
(VERTICAL PREAMPLIFIER)

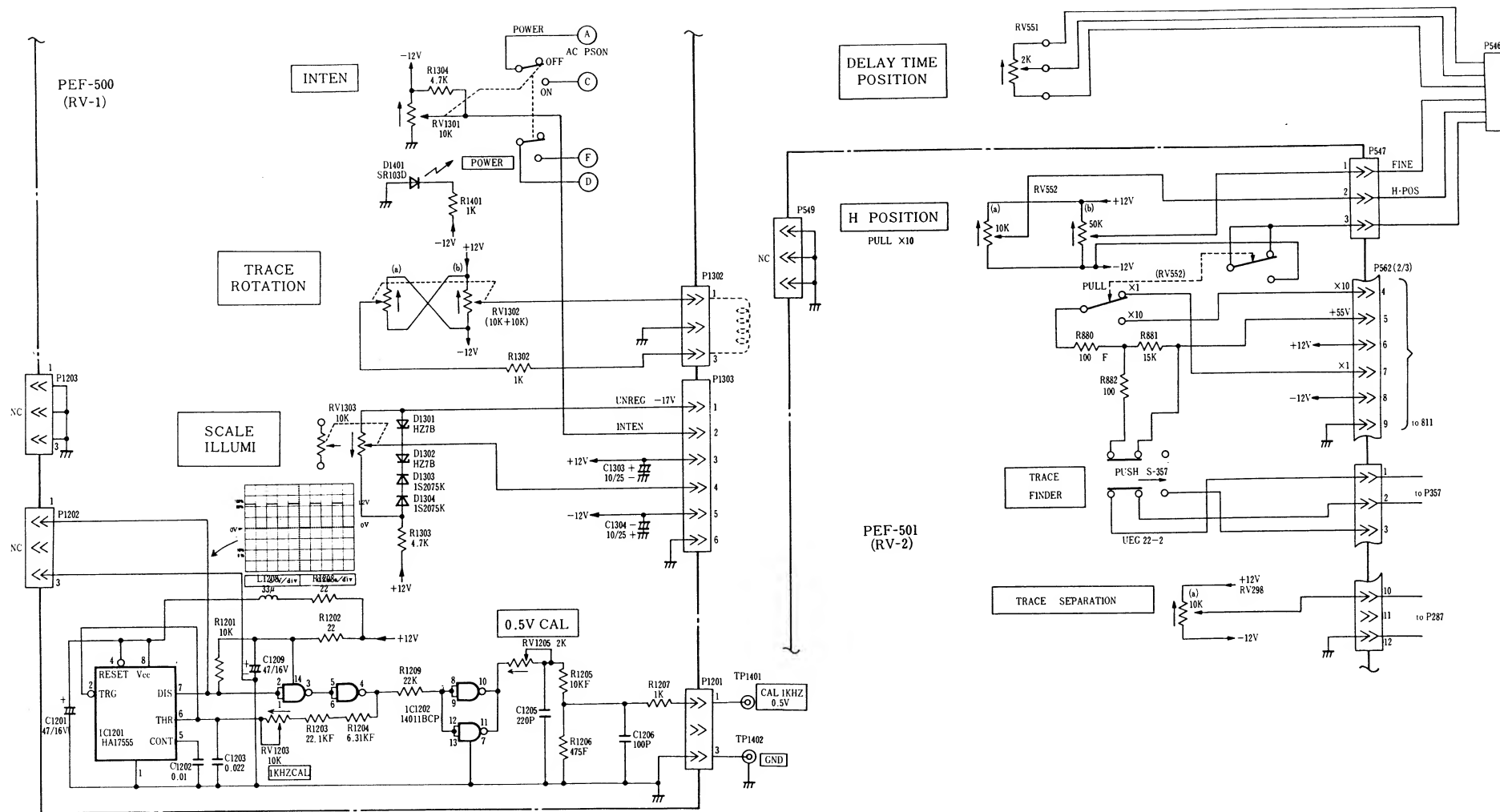








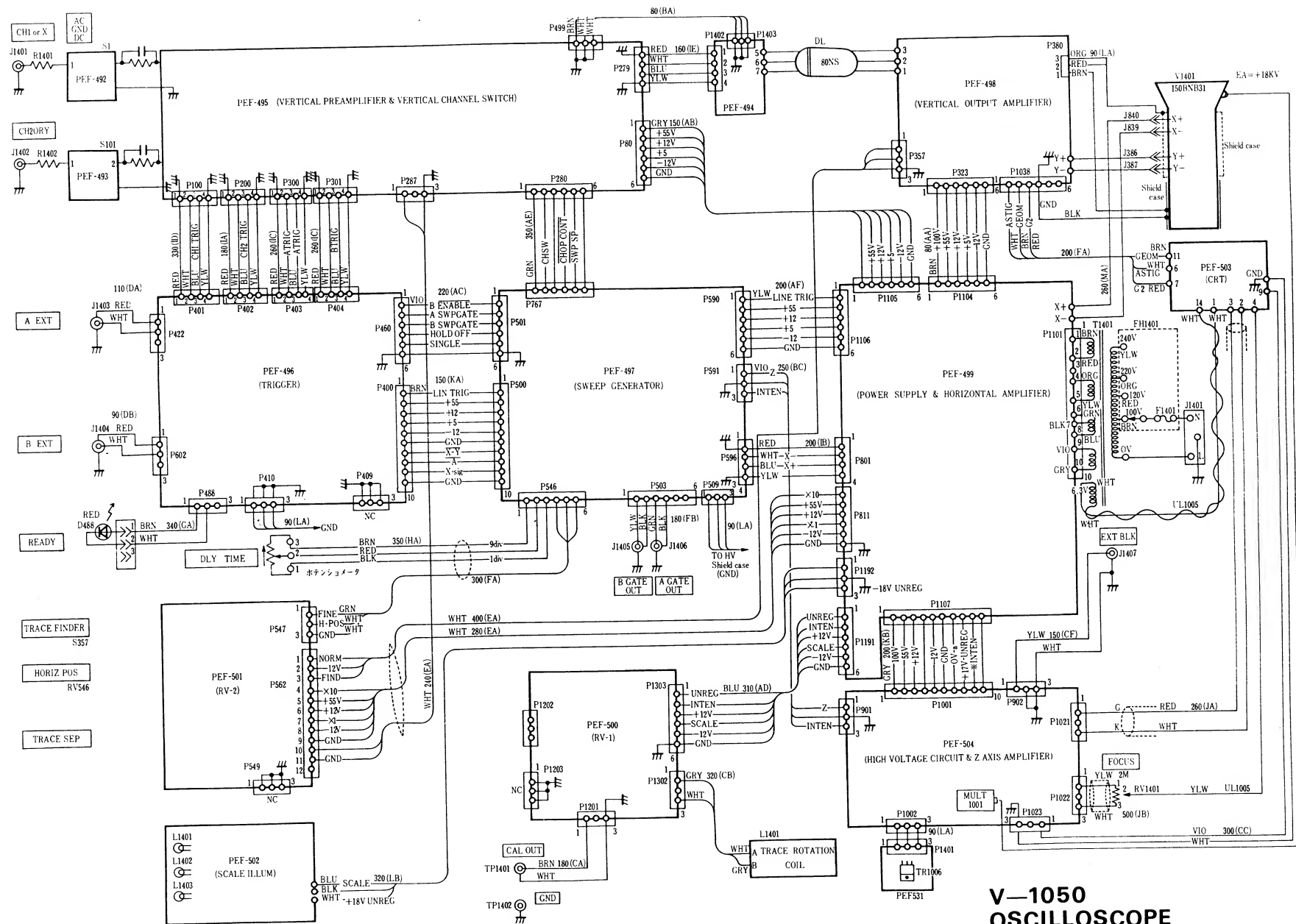




**V-1050  
OSCILLOSCOPE  
SCHEMATIC DIAGRAM**   
[CALIBRATOR & FRONT PANEL CONTROLS]







**V-1050  
OSCILLOSCOPE  
SCHEMATIC DIAGRAM** 9  
(CONNECTORS)

## ELECTRICAL REPLACEABLE PARTS LIST

### CIRCUIT BOARD (PEF-492~493)

| Simbol | Description |               |        |          |  | Code    | Q'ty |
|--------|-------------|---------------|--------|----------|--|---------|------|
| C1     | C, PLASTIC  | 600           | V22000 | PF+-10%  |  | CQX0071 | 1    |
| C101   | C, PLASTIX  | 600           | V22000 | PF+-10%  |  | CQX0071 | 1    |
| C2     | C, CERAMIC  | 50            | V 22   | PF+-5%   |  | CCC1007 | 1    |
| C102   | C, CERAMIC  | 50            | V 22   | PF+-5%   |  | CCC1007 | 1    |
| J1401  | COAX. CON   | BNC071        |        |          |  | JHB0088 | 1    |
| J1402  | COAX. CON   | BNC071        |        |          |  | JHB0088 | 1    |
| R2     | R, CARBON   | 1/4W 47       |        | OHM +-5% |  | RCR3020 | 1    |
| R102   | R, CARBON   | 1/4W 47       |        | OHM +-5% |  | RCR3020 | 1    |
| R1401  | R, CARBON   | 1/4W 10       |        | OHM +-5% |  | RCR3004 | 1    |
| R1402  | R, CARBON   | 1/4W 10       |        | OHM +-5% |  | RCR3004 | 1    |
| S1     | SW, SLIDE   | SSB023 L=9 NS | PCB    |          |  | SSV0042 | 1    |
| S101   | SW, SLIDE   | SSB023 L=9 NS | PCB    |          |  | SSV0042 | 1    |

## ELECTRICAL REPLACEABLE PARTS LIST

### CIRCUIT BOARD (PEF-494)

| Simbol  | Description |             |        |            |  | Code      | Q'ty |
|---------|-------------|-------------|--------|------------|--|-----------|------|
| C311    | C, CERAMIC  | 50          | V 5    | PF+-0.25PF |  | CCC0999VA | 1    |
| C312    | C, CERAMIC  | 50          | V 5    | PF+-0.25PF |  | CCC0999VA | 1    |
| DL1401  | DELAY LINE  | 758DL 100NS | 186OHM |            |  | HX8311698 | 1    |
| L311    | COIL        | FL-3H R22M  |        |            |  | TLF0003   | 1    |
| L312    | COIL        | FL-3H R22M  |        |            |  | TLF0003   | 1    |
| P1402   | CONNECTOR   | 171825-4    |        |            |  | JBX0704   | 1    |
| P1403   | CONNECTOR   | 171825-3    |        |            |  | JBX0468   | 1    |
| PEF-494 | PCB         | PEF-499     |        |            |  | H 116458  | R    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-495)

| Simbol | Description |              |       |            | Code      | Q'ty |
|--------|-------------|--------------|-------|------------|-----------|------|
| C3     | C, CERAMIC  | 500 V        | 5     | PF+-0.5PF  | CCC0769   | 1    |
| CV3    | C, VARIABLE | ECV-1ZW10×93 |       |            | HX3142155 | 1    |
| C4     | C, CERAMIC  | 500 V        | 1000  | PF+-10%    | CCD0217   | 1    |
| C9     | C, CERAMIC  | 500 V        | 10    | PF+-0.5PF  | CCC0772   | 1    |
| C10    | C, PLASTIC  | 50 V         | 3300  | PF+-10%    | CQA0094   | 1    |
| C11    | C, AL ELYC  | 25 V         | 10    | UF         | CEC0175   | 1    |
| C13    | C, AL ELYC  | 25 V         | 10    | UF         | CEC0175   | 1    |
| C16    | C, CERAMIC  | 50 V         | 1000  | PF+80%-20% | CCC1029   | 1    |
| C17    | C, CERAMIC  | 50 V         | 22    | PF+-5%     | CCC1007   | 1    |
| C18    | C, AL ELYC  | 16 V         | 220   | UF         | CEC0165   | 1    |
| C23    | C, CERAMIC  | 50 V         | 10000 | PF+80%-20% | CCC1030   | 1    |
| C24    | C, CERAMIC  | 50 V         | 10000 | PF+80%-20% | CCC1030   | 1    |
| C27    | C, AL ELYC  | 16 V         | 47    | UF         | CEC0170   | 1    |
| C35    | C, CERAMIC  | 500 V        | 0.5   | PF+-0.25PF | CCC0111   | 1    |
| C36    | C, CERAMIC  | 50 V         | 5     | PF+-0.25PF | CCC0999   | 1    |
| C38    | C, AL ELYC  | 16 V         | 47    | UF         | CEC0170   | 1    |
| C38A   | C, CERAMIC  | 50 V         | 10000 | PF+80%-20% | CCC1030   | 1    |
| C42    | C, CERAMIC  | 50 V         | 10000 | PF+80%-20% | CCC1030   | 1    |
| C43    | C, CERAMIC  | 50 V         | 33    | PF+-5%     | CCC1011   | 1    |
| C44    | C, CERAMIC  | 50 V         | 3     | PF+-0.25PF | CCC0997   | 1    |
| C53    | C, CERAMIC  | 50 V         | 3     | PF+-0.25%  | CCC0997   | 1    |
| C57    | C, CERAMIC  | 50 V         | 8     | PF+-0.5PF  | CCC1001   | 1    |
| C58    | C, CERAMIC  | 50 V         | 22    | PF+-5%     | CCC1007   | 1    |
| C63    | C, CERAMIC  | 50 V         | 10    | PF+-0.5%   | CCC1002   | 1    |
| CV63   | C, VARIABLE | ECV-1ZW20×93 |       |            | HX3142155 | 1    |
| C65    | C, CERAMIC  | 50 V         | 1000  | PF+80%-20% | CCC1029   | 1    |
| C66    | C, CERAMIC  | 50 V         | 22    | PF+-5%     | CCC1007   | 1    |
| C67    | C, CERAMIC  | 50 V         | 680   | PF+-10%    | CCC1365   | 1    |
| C69    | C, CERAMIC  | 50 V         | 680   | PF+-10%    | CCC1365   | 1    |

| Simbol | Description |              |        |            | Code      | Q'ty |
|--------|-------------|--------------|--------|------------|-----------|------|
| C73    | C, CERAMIC  | 50           | V 1000 | PF+80%-20% | CCC1029   | 1    |
| C73A   | C, CERAMIC  | 50           | V 3    | PF+-0.25PF | CCC0997   | 1    |
| C74A   | C, CERAMIC  | 50           | V 2    | PF+-0.25PF | CCC0996   | 1    |
| C75    | C, AL ELYC  | 25           | V 10   | UF         | CEC0175   | 1    |
| C75A   | C, CERAMIC  | 50           | V10000 | PF+80%-20% | CCC1030   | 1    |
| C88    | C, CERAMIC  | 50           | V 22   | PF+-5%     | CCC1007   | 1    |
| C90    | C, CERAMIC  | 50           | V 1000 | PF+80%-20% | CCC1029   | 1    |
| C92    | C, CERAMIC  | 50           | V 1000 | PF+80%-20% | CCC1029   | 1    |
| C97    | C, CERAMIC  | 50           | V10000 | PF+80%-20% | CCC1030   | 1    |
| C103   | C, CERAMIC  | 500          | V 5    | PF+-0.5PF  | CCC0769   | 1    |
| CV103  | C, VARIABLE | ECV-1ZW10×93 |        |            | HX3142155 | 1    |
| C104   | C, CERAMIC  | 500          | V 1000 | PF+-10%    | CCD0217   | 1    |
| C109   | C, CERAMIC  | 500          | V 10   | PF+-0.5PF  | CCC0772   | 1    |
| C110   | C, PLASTIC  | 50           | V 3300 | PF+-10%    | CQA0094   | 1    |
| C111   | C, AL ELYC  | 25           | V 10   | UF         | CEC0175   | 1    |
| C113   | C, AL ELYC  | 25           | V 10   | UF         | CEC0175   | 1    |
| C116   | C, CERAMIC  | 50           | V 1000 | PF+80%-20% | CCC1029   | 1    |
| C117   | C, CERAMIC  | 50           | V 22   | PF+-5%     | CCC1007   | 1    |
| C118   | C, AL ELYC  | 16           | V 220  | UF         | CEC0165   | 1    |
| C123   | C, CERAMIC  | 50           | V10000 | PF+80%-20% | CCC1030   | 1    |
| C124   | C, CERAMIC  | 50           | V10000 | PF+80%-20% | CCC1030   | 1    |
| C127   | C, AL ELYC  | 16           | V 47   | UF         | CEC0170   | 1    |
| C135   | C, CERAMIC  | 500          | V 0.5  | PF+-0.25PF | CCC0111   | 1    |
| C136   | C, CERAMIC  | 50           | V 5    | PF+-0.25PF | CCC0999   | 1    |
| C138   | C, AL ELYC  | 16           | V 47   | UF         | CEC0170   | 1    |
| C138A  | C, CERAMIC  | 50           | V10000 | PF+80%-20% | CCC1030   | 1    |
| C142   | C, CERAMIC  | 50           | V10000 | PF+80%-20% | CCC1030   | 1    |
| C143   | C, CERAMIC  | 50           | V 33   | PF+-5%     | CCC1011   | 1    |
| C144   | C, CERAMIC  | 50           | V 3    | PF+-0.25PF | CCC0997   | 1    |



| Simbol | Description |              |   |       |            | Code      | Q'ty |
|--------|-------------|--------------|---|-------|------------|-----------|------|
| C153   | C,CERAMIC   | 50           | V | 3     | PF+-0.25PF | CCC0997   | 1    |
| C157   | C,CERAMIC   | 50           | V | 8     | PF+-0.5PF  | CCC1001   | 1    |
| C158   | C,CERAMIC   | 50           | V | 22    | PF+-5%     | CCC1007   | 1    |
| C163   | C,CERAMIC   | 50           | V | 10    | PF+-0.5%   | CCC1002   | 1    |
| CV163  | C,VARIABLE  | ECV-1ZW20×93 |   |       |            | HX3142155 | 1    |
| C165   | C,CERAMIC   | 50           | V | 1000  | PF+80%-20% | CCC1029   | 1    |
| C166   | C,CERAMIC   | 50           | V | 22    | PF+-5%     | CCC1007   | 1    |
| C167   | C,CERAMIC   | 50           | V | 680   | PF+-10%    | CCC1365   | 1    |
| C169   | C,CERAMIC   | 50           | V | 680   | PF+-10%    | CCC1365   | 1    |
| C173   | C,CERAMIC   | 50           | V | 1000  | PF+80%-20% | CCC1029   | 1    |
| C176   | C,AL ELYC   | 25           | V | 10    | UF         | CEC0175   |      |
| C177A  | C,CERAMIC   | 50           | V | 10000 | PF+80%-20% | CCC1030   | 1    |
| C178A  | C,CERAMIC   | 50           | V | 10000 | PF+80%-20% | CCC1030   | 1    |
| C188   | C,CERAMIC   | 50           | V | 22    | PF+-5%     | CCC1007   | 1    |
| C190   | C,CERAMIC   | 50           | V | 1000  | PF+80%-20% | CCC1029   | 1    |
| C192   | C,CERAMIC   | 50           | V | 1000  | PF+80%-20% | CCC1029   | 1    |
| C197   | C,CERAMIC   | 50           | V | 10000 | PF+80%-20% | CCC1030   | 1    |
| C211   | C,AL ELYC   | 25           | V | 10    | UF         | CEC0175   | 1    |
| C212   | C,AL ELYC   | 16           | V | 47    | UF         | CEC0170   | 1    |
| C213   | C,AL ELYC   | 25           | V | 10    | UF         | CEC0175   | 1    |
| C214   | C,AL ELYC   | 25           | V | 10    | UF         | CEC0175   | 1    |
| C215   | C,CERAMIC   | 500          | V | 10000 | PF+-10%    | CCD0218   | 1    |
| C221   | C,CERAMIC   | 50           | V | 22    | PF+-5%     | CCC1007   | 1    |
| C222   | C,CERAMIC   | 50           | V | 22    | PF+-5%     | CCC1007   | 1    |
| C225   | C,CERAMIC   | 50           | V | 22    | PF+-5%     | CCC1007   | 1    |
| C226   | C,CERAMIC   | 50           | V | 22    | PF+-5%     | CCC1007   | 1    |
| C233   | C,CERAMIC   | 50           | V | 1000  | PF+80%-20% | CCC1029   | 1    |
| C243   | C,CERAMIC   | 50           | V | 1000  | PF+80%-20% | CCC1029   | 1    |
| C244   | C,CERAMIC   | 50           | V | 1000  | PF+80%-20% | CCC1029   | 1    |
| C245   | C,AL ELYC   | 25           | V | 10    | UF         | CEC0175   | 1    |

| Simbol | Description |         |     |       | Code       | Q'ty    |   |
|--------|-------------|---------|-----|-------|------------|---------|---|
| C250   | C,CERAMIC   | 50      | V   | 1000  | PF+80%-20% | CCC1029 | 1 |
| C258   | C,CERAMIC   | 50      | V   | 1000  | PF+80%-20% | CCC1029 | 1 |
| C259   | C,CERAMIC   | 50      | V   | 1000  | PF+80%-20% | CCC1029 | 1 |
| C271   | C,CERAMIC   | 50      | V   | 5     | PF+-0.25PF | CCC0999 | 1 |
| C276   | C,AL ELYC   | 25      | V   | 10    | UF         | CEC0175 | 1 |
| C277   | C,AL ELYC   | 25      | V   | 10    | UF         | CEC0175 | 1 |
| C278   | C,CERAMIC   | 50      | V   | 15    | PF+-5%     | CCC1004 | 1 |
| C279   | C,CERAMIC   | 50      | V   | 82    | PF+-5%     | CCC1032 | 1 |
| C281   | C,CERAMIC   | 50      | V   | 5     | PF+-0.25PF | CCC0999 | 1 |
| C282   | C,AL ELYC   | 25      | V   | 10    | UF         | CEC0175 | 1 |
| C287   | C,CERAMIC   | 50      | V   | 10000 | PF+80%-20% | CCC1030 | 1 |
| C294   | C,CERAMIC   | 50      | V   | 15    | PF+-5%     | CCC1004 | 1 |
| D6     | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D15    | DIODE       | 1S2075K |     |       |            | HDS0108 | 1 |
| D38    | DIODE       | HZ7BT-D |     |       |            | HDH0040 | 1 |
| D106   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D115   | DIODE       | 1S2075K |     |       |            | HDS0108 | 1 |
| D138   | DIODE       | HZ7BT-D |     |       |            | HDH0040 | 1 |
| D221   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D222   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D224   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D225   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D226   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D227   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D228   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D233   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D246   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D247   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D248   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |
| D249   | DIODE       | 1S2075  | T-D |       |            | HDS0108 | 1 |

| Simbol | Description |             |     | Code     | Q'ty |
|--------|-------------|-------------|-----|----------|------|
| D262   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D263   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D264   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D265   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D269   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D272   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D273   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D278   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D279   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D280   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D281   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D282   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D283   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D284   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| D296   | DIODE       | 1S2075      | T-D | HDS0108  | 1    |
| IC6    | IC,ANALOG   | TL071CP     |     | ILT0041  | 1    |
| IC106  | IC,ANALOG   | TL071CP     |     | ILT0041  | 1    |
| IC245  | IC,DIGITAL  | HD74LS09P   |     | IDH0680  | 1    |
| IC281  | IC,DIGITAL  | HD74LS109AP |     | IDH0713  | 1    |
| L71    | COIL        | FL-3H R47M  |     | TLF0052  | 1    |
| L74A   | CORE        | L1-RH0303   |     | HX841221 | 1    |
| L75A   | CORE        | L1-RH0303   |     | HX841221 | 1    |
| L171   | COIL        | FL-3H R47M  |     | TLF0052  | 1    |
| L221A  | COIL        | FL-3H 100K  |     | TLF0028  | 1    |
| L225A  | COIL        | FL-3H 100K  |     | TLF0028  | 1    |
| L246A  | COIL        | FL-3H 100K  |     | TLF0028  | 1    |
| L262A  | COIL        | FL-3H 100K  |     | TLF0028  | 1    |
| L279   | COIL        | FL-3H R47M  |     | TLF0052  | 1    |
| L280   | COIL        | FL-3H R47M  |     | TLF0052  | 1    |
| P80    | CONNECTOR   | 171825-6    |     | JBX0470  | 1    |

| Simbol | Description |          |      |             | Code    | Q'ty |
|--------|-------------|----------|------|-------------|---------|------|
| P100   | CONNECTOR   | 171825-4 |      |             | JBX0704 | 1    |
| P200   | CONNECTOR   | 171825-4 |      |             | JBX0704 | 1    |
| P279   | CONNECTOR   | 171825-4 |      |             | JBX0704 | 1    |
| P280   | CONNECTOR   | 171825-6 |      |             | JBX0470 | 1    |
| P287   | CONNECTOR   | 171825-3 |      |             | JBX0468 | 1    |
| P300   | CONNECTOR   | 171825-4 |      |             | JBX0704 | 1    |
| P301   | CONNECTOR   | 171825-4 |      |             | JBX0704 | 1    |
| PEF495 | PCB         | PEF-495  |      |             | 116456  | 1    |
| P499   | CONNECTOR   | 171825-3 |      |             | JBX0468 | 1    |
| PEF530 | PCB         | PEF-499  |      |             | 116458  | R    |
| R3     | R, CARBON   | 1/4W     | 10   | OHM +-5%    | RCR3004 | 1    |
| R4     | R, CARBON   | 1/4W     | 6.8  | OHM +-5%    | RCR3003 | 1    |
| R5     | R, METAL    | 1/4W     | 500  | KOHM +-0.5% | RME0828 | 1    |
| R6     | R, METAL    | 1/4W     | 500  | KOHM +-0.5% | RME0828 | 1    |
| R7     | R, METAL    | 1/4W     | 22.1 | KOHM +-1%   | RME0680 | 1    |
| RV7    | VR, METAL   | CR29R    | 22   | KOHM        | 8348450 | 1    |
| R8     | R, CARBON   | 1/4W     | 6.8  | KOHM +-5%   | RCR3072 | 1    |
| R9     | R, CARBON   | 1/4W     | 220  | OHM +-5%    | RCR3036 | 1    |
| R10    | R, CARBON   | 1/4W     | 220  | OHM +-5%    | RCR3036 | 1    |
| R11    | R, CARBON   | 1/4W     | 2.2  | KOHM +-5%   | RCR3060 | 1    |
| R12    | R, CARBON   | 1/4W     | 10   | KOHM +-5%   | RCR3076 | 1    |
| R13    | R, CARBON   | 1/4W     | 3.3  | KOHM +-5%   | RCR3064 | 1    |
| R14    | R, CARBON   | 1/4W     | 220  | OHM +-5%    | RCR3036 | 1    |
| R15    | R, SOLID    | 1/4W     | 10   | MOHM +-5%   | RSE0434 | 1    |
| R16    | R, CARBON   | 1/4W     | 100  | OHM +-5%    | RCR3028 | 1    |
| R17    | R, CARBON   | 1/4W     | 680  | OHM +-5%    | RCR3048 | 1    |
| R18    | R, CARBON   | 1/4W     | 22   | OHM +-5%    | RCR3012 | 1    |
| R21    | R, METAL    | 1/4W     | 4.00 | KOHM +-0.5% | RME0707 | 1    |
| R22    | R, METAL    | 1/4W     | 180  | KOHM +-0.5% | RME0829 | 1    |
| R23    | R, CARBON   | 1/4W     | 22   | OHM +-5%    | RCR3012 | 1    |

| Simbol | Description |        |                 |             | Code      | Q'ty |
|--------|-------------|--------|-----------------|-------------|-----------|------|
| R24    | R, CARBON   | 1/4W   | 22              | OHM +-5%    | RCR3012   | 1    |
| R25    | R, METAL    | 1/4W   | 16.0            | KOHM +-0.5% | RME0830   | 1    |
| R27    | R, CARBON   | 1/4W   | 22              | OHM +-5%    | RCR3012   | 1    |
| R28    | R, METAL    | 1/4W   | 20.0            | OHM +-0.5%  | RME0831   | 1    |
| R28B   | R, METAL    | 1/4W   | 274             | OHM+-1%     | RME0715   | 1    |
| R31    | R, CARBON   | 1/4W   | 1.0             | KOHM +-5%   | RCR3052   | 1    |
| R32    | R, METAL    | 1/4W   | 562             | OHM +-1%    | RME0661   | 1    |
| R33    | R, CARBON   | 1/4W   | 560             | OHM +-5%    | RCR3046   | 1    |
| RV33   | VR, METAL   | CR29R  | 470             | OHM         | HX8348450 | 1    |
| R34    | R, CARBON   | 1/4W   | 3.3             | KOHM +-5%   | RCR3064   | 1    |
| R35    | R, METAL    | 1/4W   | 475             | OHM +-0.5%  | RME0703   | 1    |
| R36    | R, CARBON   | 1/4W   | 220             | OHM +-5%    | RCR3036   | 1    |
| R37    | R, CARBON   | 1/4W   | 2.2             | KOHM +-5%   | RCR3060   | 1    |
| R38    | R, CARBON   | 1/4W   | 1.5             | KOHM +-5%   | RCR3056   | 1    |
| R41    | R, CARBON   | 1/4W   | 100             | OHM +-5%    | RCR3028   | 1    |
| R42    | R, CARBON   | 1/4W   | 22              | OHM +-5%    | RCR3012   | 1    |
| R43    | R, CARBON   | 1/4W   | 6.8             | OHM +-5%    | RCR3003   | 1    |
| RV43   | SW, ROTARY  | ATT SW | FOR V-1050 W-RV |             | H 3142145 | 1    |
| R44    | R, CARBON   | 1/4W   | 100             | OHM +-5%    | RCR3028   | 1    |
| R45    | R, METAL    | 1/4W   | 332             | OHM +-1%    | RME0658   | 1    |
| R46    | R, CARBON   | 1/4W   | 180             | OHM +-5%    | RCR3034   | 1    |
| R51    | R, METAL    | 1/4W   | 150             | OHM +-0.5%  | RME0709   | 1    |
| R52    | R, METAL    | 1/4W   | 75.0            | OHM +-0.5%  | RME0832   | 1    |
| R53    | R, METAL    | 1/4W   | 75.0            | OHM +-0.5%  | RME0832   | 1    |
| R55    | R, CARBON   | 1/4W   | 18              | OHM +-5%    | RCR3010   | 1    |
| R57    | R, CARBON   | 1/4W   | 68              | OHM +-5%    | RCR3024   | 1    |
| R58    | R, CARBON   | 1/4W   | 22              | OHM +-5%    | RCR3012   | 1    |
| R59    | R, CARBON   | 1/4W   | 10              | KOHM +-5%   | RCR3076   | 1    |
| R61    | R, METAL    | 1/4W   | 2.21            | KOHM +-1%   | RME0668   | 1    |
| R62    | R, METAL    | 1/4W   | 2.21            | KOHM +-1%   | RME0668   | 1    |

| Simbol | Description |               |      |           | Code      | Q'ty |
|--------|-------------|---------------|------|-----------|-----------|------|
| R63    | R, CARBON   | 1/4W          | 6.8  | OHM +-5%  | RCR3003   | 1    |
| RV63   | VR, METAL   | CR29R         | 100  | OHM       | HX8348450 | 1    |
| R64    | R, METAL    | 1/4W          | 47.5 | OHM +-1%  | RME0648   | 1    |
| R65    | R, CARBON   | 1/4W          | 10   | KOHM +-5% | RCR3076   | 1    |
| R66    | R, CARBON   | 1/4W          | 33   | OHM +-5%  | RCR3016   | 1    |
| R67    | R, CARBON   | 1/4W          | 560  | OHM +-5%  | RCR3046   | 1    |
| R67A   | R, CARBON   | 1/4W          | 47   | OHM +-5%  | RCR3020   | 1    |
| R68    | R, CARBON   | 1/4W          | 560  | OHM +-5%  | RCR3046   | 1    |
| R69    | R, CARBON   | 1/4W          | 47   | OHM +-5%  | RCR3020   | 1    |
| R70    | R, METAL    | 1/4W          | 4.75 | KOHM +-1% | RME0672   | 1    |
| R70A   | R, METAL    | 1/4W          | 4.75 | KOHM +-1% | RME0672   | 1    |
| R71    | R, CARBON   | 1/4W          | 150  | OHM +-5%  | RCR3032   | 1    |
| RV71   | VR, CARBON  | EVH-Y13K20B13 |      |           | RDE0013   | 1    |
| R72    | R, CARBON   | 1/4W          | 150  | OHM +-5%  | RCR3032   | 1    |
| R73    | R, METAL    | 1/4W          | 825  | OHM +-1%  | RME0663   | 1    |
| R73A   | R, CARBON   | 1/4W          | 220  | OHM +-5%  | RCR3036   | 1    |
| RV73   | VR, METAL   | CR29R         | 22   | KOHM      | H 8348450 | 1    |
| R74    | R, METAL    | 1/4W          | 825  | OHM +-1%  | RME0663   | 1    |
| R75    | R, CARBON   | 1/4W          | 220  | OHM +-5%  | RCR3036   | 1    |
| R75A   | R, CARBON   | 1/4W          | 22   | OHM +-5%  | RCR3012   | 1    |
| R82    | R, CARBON   | 1/4W          | 220  | KOHM +-5% | RCR3102   | 1    |
| R84    | R, CARBON   | 1/4W          | 100  | OHM +-5%  | RCR3028   | 1    |
| R85    | R, CARBON   | 1/4W          | 100  | OHM +-5%  | RCR3028   | 1    |
| R88    | R, METAL    | 1/4W          | 47.5 | OHM +-1%  | RME0648   | 1    |
| R90    | R, CARBON   | 1/4W          | 470  | OHM +-5%  | RCR3044   | 1    |
| R91    | R, CARBON   | 1/4W          | 470  | OHM +-5%  | RCR3044   | 1    |
| R92    | R, CARBON   | 1/4W          | 10   | OHM +-5%  | RCR3004   | 1    |
| R93    | R, METAL    | 1/4W          | 562  | OHM +-1%  | RME0661   | 1    |
| R94    | R, METAL    | 1/4W          | 562  | OHM +-1%  | RME0661   | 1    |
| R95    | R, METAL    | 1/4W          | 392  | OHM +-1%  | RME0659   | 1    |

| Simbol | Description |       |      |             | Code      | Q'ty |
|--------|-------------|-------|------|-------------|-----------|------|
| R96    | R,METAL     | 1/4W  | 221  | OHM +-1%    | RME0656   | 1    |
| R96A   | R,METAL     | 1/4W  | 221  | OHM +-1%    | RME0656   | 1    |
| R97    | R,CARBON    | 1/4W  | 1.5  | KOHM +-5%   | RCR3056   | 1    |
| R97A   | R,CARBON    | 1/4W  | 1.5  | KOHM +-5%   | RCR3056   | 1    |
| R98    | R,METAL     | 1/4W  | 71.5 | OHM +-1%    | RME0737   | 1    |
| R98A   | R,METAL     | 1/4W  | 71.5 | OHM +-1%    | RME0737   | 1    |
| R99A   | R,METAL     | 1/4W  | 2.21 | KOHM +-1%   | RME0668   | 1    |
| R99B   | R,METAL     | 1/4W  | 2.21 | KOHM +-1%   | RME0668   | 1    |
| R103   | R,CARBON    | 1/4W  | 10   | OHM +-5%    | RCR3004   | 1    |
| R104   | R,CARBON    | 1/4W  | 6.8  | OHM +-5%    | RCR3003   | 1    |
| R105   | R,METAL     | 1/4W  | 500  | KOHM +-0.5% | RME0828   | 1    |
| R106   | R,METAL     | 1/4W  | 500  | KOHM +-0.5% | RME0828   | 1    |
| R107   | R,METAL     | 1/4W  | 22.1 | KOHM +-1%   | RME0680   | 1    |
| RV107  | VR,METAL    | CR29R | 22   | KOHM        | H 8348450 | 1    |
| R108   | R,CARBON    | 1/4W  | 6.8  | KOHM +-5%   | RCR3072   | 1    |
| R109   | R,CARBON    | 1/4W  | 220  | OHM +-5%    | RCR3036   | 1    |
| R110   | R,CARBON    | 1/4W  | 220  | OHM +-5%    | RCR3036   | 1    |
| R111   | R,CARBON    | 1/4W  | 2.2  | KOHM +-5%   | RCR3060   | 1    |
| R112   | R,CARBON    | 1/4W  | 10   | KOHM +-5%   | RCR3076   | 1    |
| R113   | R,CARBON    | 1/4W  | 3.3  | KOHM +-5%   | RCR3064   | 1    |
| R114   | R,CARBON    | 1/4W  | 220  | OHM +-5%    | RCR3036   | 1    |
| R115   | R,SOLID     | 1/4W  | 10   | MOHM +-5%   | RSE0434   | 1    |
| R116   | R,CARBON    | 1/4W  | 100  | OHM +-5%    | RCR3028   | 1    |
| R117   | R,CARBON    | 1/4W  | 680  | OHM +-5%    | RCR3048   | 1    |
| R118   | R,CARBON    | 1/4W  | 22   | OHM +-5%    | RCR3012   | 1    |
| R121   | R,METAL     | 1/4W  | 4.00 | KOHM +-0.5% | RME0707   | 1    |
| R122   | R,METAL     | 1/4W  | 180  | KOHM +-0.5% | RME0829   | 1    |
| R123   | R,CARBON    | 1/4W  | 22   | OHM +-5%    | RCR3012   | 1    |
| R124   | R,CARBON    | 1/4W  | 22   | OHM +-5%    | RCR3012   | 1    |
| R125   | R,METAL     | 1/4W  | 16   | KOHM +-0.5% | RME0830   | 1    |

| Simbol | Description |        |                 |            | Code      | Q'ty |
|--------|-------------|--------|-----------------|------------|-----------|------|
| R127   | R,CARBON    | 1/4W   | 22              | OHM +-5%   | RCR3012   | 1    |
| R128   | R,METAL     | 1/4W   | 20.0            | OHM +-0.5% | RME0831   | 1    |
| R128B  | R,METAL     | 1/4W   | 274             | OHM +-1%   | RME0715   | 1    |
| R131   | R,CARBON    | 1/4W   | 1.0             | KOHM +-5%  | RCR3052   | 1    |
| R132   | R,METAL     | 1/4W   | 562             | OHM +-1%   | RME0661   | 1    |
| R133   | R,CARBON    | 1/4W   | 560             | OHM +-5%   | RCR3046   | 1    |
| RV133  | VR,METAL    | CR29R  | 470             | OHM        | HX8348450 | 1    |
| R134   | R,CARBON    | 1/4W   | 3.3             | KOHM +-5%  | RCR3064   | 1    |
| R135   | R,METAL     | 1/4W   | 475             | OHM +-0.5% | RME0703   | 1    |
| R136   | R,CARBON    | 1/4W   | 220             | OHM +-5%   | RCR3036   | 1    |
| R137   | R,CARBON    | 1/4W   | 2.2             | KOHM +-5%  | RCR3060   | 1    |
| R138   | R,CARBON    | 1/4W   | 1.5             | KOHM +-5%  | RCR3056   | 1    |
| R141   | R,CARBON    | 1/4W   | 100             | OHM +-5%   | RCR3028   | 1    |
| R142   | R,CARBON    | 1/4W   | 22              | OHM +-5%   | RCR3012   | 1    |
| R143   | R,CARBON    | 1/4W   | 6.8             | OHM +-5%   | RCR3003   | 1    |
| RV143  | SW,ROTARY   | ATT SW | FOR V-1050 W/RV |            | H 3142145 | R    |
| R144   | R,CARBON    | 1/4W   | 100             | OHM +-5%   | RCR3028   | 1    |
| R145   | R,METAL     | 1/4W   | 332             | OHM +-1%   | RME0658   | 1    |
| R146   | R,CARBON    | 1/4W   | 180             | OHM +-5%   | RCR3034   | 1    |
| R151   | R,METAL     | 1/4W   | 150             | OHM +-0.5% | RME0709   | 1    |
| R152   | R,METAL     | 1/4W   | 75.0            | OHM +-0.5% | RME0832   | 1    |
| R153   | R,METAL     | 1/4W   | 75.0            | OHM +-0.5% | RME0832   | 1    |
| R155   | R,CARBON    | 1/4W   | 18              | OHM +-5%   | RCR3010   | 1    |
| R157   | R,CARBON    | 1/4W   | 68              | OHM +-5%   | RCR3024   | 1    |
| R158   | R,CARBON    | 1/4W   | 22              | OHM +-5%   | RCR3012   | 1    |
| R159   | R,CARBON    | 1/4W   | 10              | KOHM +-5%  | RCR3076   | 1    |
| R160   | R,CARBON    | 1/4W   | 120             | OHM +-5%   | RCR3030   | 1    |
| RV160  | VR,METAL    | CR29R  | 100             | OHM        | HX8348450 | 1    |
| R161   | R,METAL     | 1/4W   | 2.21            | KOHM +-1%  | RME0668   | 1    |
| R162   | R,METAL     | 1/4W   | 2.21            | KOHM +-1%  | RME0668   | 1    |



| Simbol | Description |               |      |           | Code      | Q'ty |
|--------|-------------|---------------|------|-----------|-----------|------|
| R163   | R, CARBON   | 1/4W          | 22   | OHM +-5%  | RCR3012   | 1    |
| RV163  | VR, METAL   | CR29R         | 100  | OHM       | HX8348450 | 1    |
| R164   | R, METAL    | 1/4W          | 68.1 | OHM +-1%  | RME0650   | 1    |
| R165   | R, CARBON   | 1/4W          | 10   | KOHM +-5% | RCR3076   | 1    |
| R166   | R, CARBON   | 1/4W          | 33   | OHM +-5%  | RCR3016   | 1    |
| R167   | R, CARBON   | 1/4W          | 560  | OHM +-5%  | RCR3046   | 1    |
| R167A  | R, CARBON   | 1/4W          | 47   | OHM +-5%  | RCR3020   | 1    |
| R168   | R, CARBON   | 1/4W          | 560  | OHM +-5%  | RCR3046   | 1    |
| R169   | R, CARBON   | 1/4W          | 47   | OHM +-5%  | RCR3020   | 1    |
| R170   | R, METAL    | 1/4W          | 4.75 | KOHM +-1% | RME0672   | 1    |
| R170A  | R, METAL    | 1/4W          | 4.75 | KOHM +-1% | RME0672   | 1    |
| R171   | R, CARBON   | 1/4W          | 150  | OHM +-5%  | RCR3032   | 1    |
| RV171  | VR, CARBON  | EVH-Y13K20B13 |      |           | RDE0013   | 1    |
| R172   | R, CARBON   | 1/4W          | 150  | OHM +-5%  | RCR3032   | 1    |
| R173   | R, METAL    | 1/4W          | 825  | OHM +-1%  | RME0663   | 1    |
| RV173  | VR, METAL   | CR29R         | 22   | KOHM      | H 8348450 | 1    |
| R174   | R, METAL    | 1/4W          | 825  | OHM +-1%  | RME0663   | 1    |
| R175   | R, CARBON   | 1/4W          | 220  | OHM +-5%  | RCR3036   | 1    |
| R176   | R, CARBON   | 1/4W          | 220  | OHM +-5%  | RCR3036   | 1    |
| R177   | R, CARBON   | 1/4W          | 2.2  | KOHM +-5% | RCR3060   | 1    |
| R177A  | R, CARBON   | 1/4W          | 10   | OHM +-5%  | RCR3004   | 1    |
| R178   | R, CARBON   | 1/4W          | 2.2  | KOHM +-5% | RCR3060   | 1    |
| R178A  | R, CARBON   | 1/4W          | 10   | OHM +-5%  | RCR3004   | 1    |
| R182   | R, CARBON   | 1/4W          | 220  | KOHM +-5% | RCR3102   | 1    |
| R184   | R, CARBON   | 1/4W          | 100  | OHM +-5%  | RCR3028   | 1    |
| R185   | R, CARBON   | 1/4W          | 100  | OHM +-5%  | RCR3028   | 1    |
| R188   | R, METAL    | 1/4W          | 47.5 | OHM +-1%  | RME0648   | 1    |
| R190   | R, CARBON   | 1/4W          | 470  | OHM +-5%  | RCR3044   | 1    |
| R191   | R, CARBON   | 1/4W          | 470  | OHM +-5%  | RCR3044   | 1    |
| R192   | R, CARBON   | 1/4W          | 10   | OHM +-5%  | RCR3004   | 1    |

| Simbol | Description |       |      |           | Code      | Q'ty |
|--------|-------------|-------|------|-----------|-----------|------|
| R193   | R,METAL     | 1/4W  | 562  | OHM +-1%  | RME0661   | 1    |
| R194   | R,METAL     | 1/4W  | 562  | OHM +-1%  | RME0661   | 1    |
| R195   | R,METAL     | 1/4W  | 392  | OHM +-1%  | RME0659   | 1    |
| R196   | R,METAL     | 1/4W  | 221  | OHM +-1%  | RME0656   | 1    |
| R196A  | R,METAL     | 1/4W  | 221  | OHM +-1%  | RME0656   | 1    |
| R197   | R,CARBON    | 1/4W  | 1.5  | KOHM +-5% | RCR3056   | 1    |
| R197A  | R,CARBON    | 1/4W  | 1.5  | KOHM +-5% | RCR3056   | 1    |
| R198   | R,METAL     | 1/4W  | 71.5 | OHM +-1%  | RME0737   | 1    |
| R198A  | R,METAL     | 1/4W  | 71.5 | OHM +-1%  | RME0737   | 1    |
| R199A  | R,METAL     | 1/4W  | 2.21 | KOHM +-1% | RME0668   | 1    |
| R199B  | R,METAL     | 1/4W  | 2.21 | KOHM +-1% | RME0668   | 1    |
| R221A  | R,CARBON    | 1/4W  | 1    | KOHM +-5% | RCR3052   | 1    |
| R221   | R,CARBON    | 1/4W  | 47   | OHM +-5%  | RCR3020   | 1    |
| R222   | R,CARBON    | 1/4W  | 47   | OHM +-5%  | RCR3020   | 1    |
| R225A  | R,CARBON    | 1/4W  | 1    | KOHM +-5% | RCR3052   | 1    |
| R225   | R,CARBON    | 1/4W  | 47   | OHM +-5%  | RCR3020   | 1    |
| R226   | R,CARBON    | 1/4W  | 47   | OHM +-5%  | RCR3020   | 1    |
| R231   | R,CARBON    | 1/4W  | 2.7  | KOHM +-5% | RCR3062   | 1    |
| RV231  | VR,METAL    | CR29R | 4.7  | KOHM      | HX8348450 | 1    |
| R232   | R,CARBON    | 1/4W  | 2.2  | KOHM +-5% | RCR3060   | 1    |
| R233   | R,CARBON    | 1/4W  | 120  | OHM +-5%  | RCR3030   | 1    |
| R234   | R,CARBON    | 1/4W  | 120  | OHM +-5%  | RCR3030   | 1    |
| R237   | R,METAL     | 1/4W  | 182  | OHM +-1%  | RME0655   | 1    |
| R241   | R,METAL     | 1/4W  | 1.21 | KOHM +-1% | RME0665   | 1    |
| R242   | R,METAL     | 1/4W  | 1.21 | KOHM +-1% | RME0665   | 1    |
| R243   | R,CARBON    | 1/4W  | 220  | OHM +-5%  | RCR3036   | 1    |
| R244   | R,CARBON    | 1/4W  | 220  | OHM +-5%  | RCR3012   | 1    |
| R245   | R,CARBON    | 1/4W  | 22   | OHM +-5%  | RCR3036   | 1    |
| R246A  | R,CARBON    | 1/4W  | 1    | KOHM +-5% | RCR3052   | 1    |
| R248   | R,CARBON    | 1/4W  | 1.8  | KOHM +-5% | RCR3058   | 1    |

| Simbol | Description |       |      |            | Code    | Q'ty |
|--------|-------------|-------|------|------------|---------|------|
| R249   | R, CARBON   | 1/4W  | 2.2  | KOHM +-5%  | RCR3060 | 1    |
| RV249  | VR, METAL   | CR19R | 4.7  | KOHM       | RDC0003 | 1    |
| R250   | R, CARBON   | 1/4W  | 120  | OHM +-5%   | RCR3030 | 1    |
| R252   | R, CARBON   | 1/4W  | 120  | OHM +-5%   | RCR3030 | 1    |
| R254   | R, METAL    | 1/4W  | 182  | OHM +-1%   | RME0655 | 1    |
| R256   | R, METAL    | 1/4W  | 1.21 | KOHM +-1%  | RME0665 | 1    |
| R257   | R, METAL    | 1/4W  | 1.21 | KOHM +-1%  | RME0665 | 1    |
| R258   | R, CARBON   | 1/4W  | 220  | OHM +-5%   | RCR3036 | 1    |
| R259   | R, CARBON   | 1/4W  | 220  | OHM +-5%   | RCR3036 | 1    |
| R262A  | R, CARBON   | 1/4W  | 1    | KOHM +-5%  | RCR3052 | 1    |
| R265   | R, CARBON   | 1/4W  | 2.2  | KOHM +-5%  | RCR3060 | 1    |
| R266   | R, CARBON   | 1/4W  | 10   | KOHM +-5%  | RCR3076 | 1    |
| R267   | R, CARBON   | 1/4W  | 6.8  | KOHM +-5%  | RCR3072 | 1    |
| R268   | R, CARBON   | 1/4W  | 10   | KOHM +-5%  | RCR3076 | 1    |
| R269   | R, METAL    | 1/4W  | 2.67 | KOHM +-1%  | RME0669 | 1    |
| R270   | R, METAL    | 1/4W  | 2.67 | KOHM +-1%  | RME0669 | 1    |
| R271   | R, METAL    | 1/4W  | 221  | OHM +-1%   | RME0656 | 1    |
| R271A  | R, CARBON   | 1/4W  | 150  | OHM +-5%   | RCR3032 | 1    |
| R272   | R, METAL    | 1/4W  | 221  | OHM +-1%   | RME0656 | 1    |
| R273   | R, METAL    | 1/4W  | 1.00 | KOHM +-1%  | RME0664 | 1    |
| R274   | R, METAL    | 1/4W  | 1.00 | KOHM +-1%  | RME0664 | 1    |
| R275   | R, METAL    | 1/4W  | 1.00 | KOHM +-1%  | RME0664 | 1    |
| R276   | R, CARBON   | 1/4W  | 33   | OHM +-5%   | RCR3016 | 1    |
| R277   | R, METAL    | 1/4W  | 750  | OHM +-1%   | RCR0827 | 1    |
| R278   | R, METAL    | 1/4W  | 750  | OHM +-1%   | RME0827 | 1    |
| R279   | R, METAL    | 1/4W  | 86.6 | OHM +-0.5% | RME0713 | 1    |
| R280   | R, METAL    | 1/4W  | 86.6 | OHM +-0.5% | RME0713 | 1    |
| R281   | R, CARBON   | 1/4W  | 330  | OHM +-5%   | RCR3040 | 1    |
| R282   | R, CARBON   | 1/4W  | 22   | OHM +-5%   | RCR3012 | 1    |
| R283   | R, METAL    | 1/4W  | 392  | OHM +-1%   | RME0659 | 1    |

| Simbol | Description |           |                 |           | Code      | Q'ty |
|--------|-------------|-----------|-----------------|-----------|-----------|------|
| R284   | R, METAL    | 1/4W      | 392             | OHM +-1%  | RME0659   | 1    |
| R285   | R, CARBON   | 1/4W      | 100             | OHM +-5%  | RCR3028   | 1    |
| R286   | R, CARBON   | 1/4W      | 100             | OHM +-5%  | RCR3028   | 1    |
| R286A  | R, CARBON   | 1/4W      | 150             | OHM +-5%  | RCR3032   | 1    |
| R287   | R, CARBON   | 1/4W      | 10              | KOHM +-5% | RCR3076   | 1    |
| R288   | R, CARBON   | 1/4W      | 150             | OHM +-5%  | RCR3032   | 1    |
| R289   | R, METAL    | 1/4W      | 1.50            | KOHM +-1% | RME0666   | 1    |
| R290   | R, METAL    | 1/4W      | 3.32            | KOHM +-1% | RME0670   | 1    |
| R291   | R, METAL    | 1/4W      | 825             | OHM +-1%  | RME0663   | 1    |
| R291B  | R, METAL    | 1/4W      | 825             | OHM +-1%  | RME0663   | 1    |
| R292   | R, METAL    | 1/4W      | 4.75            | KOHM +-1% | RME0672   | 1    |
| R293   | R, METAL    | 1/4W      | 2.43            | KOHM +-1% | RME0799   | 1    |
| R294   | R, METAL    | 1/4W      | 3.92            | KOHM +-1% | RME0671   | 1    |
| R295   | R, METAL    | 1/4W      | 4.75            | KOHM +-1% | RME0672   | 1    |
| R296   | R, CARBON   | 1/4W      | 4.7             | KOHM +-5% | RCR3068   | 1    |
| R297   | R, METAL    | 1/4W      | 1.50            | KOHM +-1% | RME0666   | 1    |
| S2     | SW, ROTARY  | ATT SW    | FOR V-1050 W/RV |           | H 3142145 | 1    |
| S102   | SW, ROTARY  | ATT SW    | FOR V-1050 W/RV |           | H 3142145 | 1    |
| S178   | SW, PUSH    | UEG22-2   |                 |           | HX8311793 | 1    |
| S279   | SW, PB      | SPJR TYPE |                 |           | H 3159320 | 1    |
| S281   | SW, LEVER   | SLA225    |                 |           | SSL0056   | 1    |
| S282   | SW, PUSH    | UEG22-2   |                 |           | HX8311793 | 1    |
| TR4    | TRANSISTOR  | 2SK55D    |                 |           | HTK0051   | 1    |
| TR14   | TRANSISTOR  | 2SC1906   |                 |           | HTC0338   | 1    |
| TR36   | TRANSISTOR  | 2SC1674K  |                 |           | HTC0557   | 1    |
| TR38   | TRANSISTOR  | 2SA781K   |                 |           | HTA0099   | 1    |
| TR42   | TRANSISTOR  | 2SC1906   |                 |           | HTC0338   | 1    |
| TR58   | TRANSISTOR  | 2SC2026   |                 |           | HTC0400   | 1    |
| TR66   | TRANSISTOR  | 2SC2026   |                 |           | HTC0400   | 1    |
| TR73   | TRANSISTOR  | 2SA781K   |                 |           | HTA0099   | 1    |

| Simbol | Description          | Code    | Q'ty |
|--------|----------------------|---------|------|
| TR74   | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR86   | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR87   | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR93   | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR94   | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR104  | TRANSISTOR 2SK55 D   | HTK0051 | 1    |
| TR114  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR136  | TRANSISTOR 2SC1674 K | HTC0557 | 1    |
| TR138  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR142  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR158  | TRANSISTOR 2SC2026   | HTC0400 | 1    |
| TR166  | TRANSISTOR 2SC2026   | HTC0400 | 1    |
| TR173  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR174  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR178  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR179  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR186  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR187  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR193  | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR194  | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR243  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR244  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR258  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR259  | TRANSISTOR 2SA781 K  | HTA0099 | 1    |
| TR265  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR268  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR271  | TRANSISTOR 2SC1747   | HTC0496 | 1    |
| TR272  | TRANSISTOR 2SC1747   | HTC0496 | 1    |
| TR285  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR286  | TRANSISTOR 2SC1906   | HTC0338 | 1    |

| Simbol | Description |         | Code    | Q'ty |
|--------|-------------|---------|---------|------|
| TR291  | TRANSISTOR  | 2SC458C | HTC0148 | 1    |
| TR292  | TRANSISTOR  | 2SC458C | HTC0148 | 1    |
|        | TERMINAL    | FT-E-12 | ETS0005 | 1    |
|        | TERMINAL    | FT-E-12 | ETS0005 | 1    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-496)

| Simbol | Description |       |       |            | Code    | Q'ty |
|--------|-------------|-------|-------|------------|---------|------|
| C202   | C, CERAMIC  | 50 V  | 1     | PF+-0.25PF | CCC1133 | 1    |
| C203   | C, CERAMIC  | 50 V  | 10    | PF+-5%     | CCC1002 | 1    |
| C206   | C, CERAMIC  | 50 V  | 47    | PF+-5%     | CCC1014 | 1    |
| C207   | C, CERAMIC  | 50 V  | 1000  | PF+80%-20% | CCC1029 | 1    |
| C211   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C212   | C, AL ELYC  | 16 V  | 47    | UF         | CEC0170 | 1    |
| C213   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C214   | C, CERAMIC  | 50 V  | 5     | PF+-0.25PF | CCC0769 | 1    |
| C219   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C302   | C, CERAMIC  | 50 V  | 1     | PF+-0.25PF | CCC1133 | 1    |
| C303   | C, CERAMIC  | 50 V  | 5     | PF+-0.25PF | CCC1007 | 1    |
| C306   | C, CERAMIC  | 50 V  | 1000  | PF+80%-20% | CCC1029 | 1    |
| C307   | C, CERAMIC  | 50 V  | 1000  | PF+80%-20% | CCC1029 | 1    |
| C311   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C313   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C314   | C, CERAMIC  | 50 V  | 5     | PF+-0.25PF | CCC0769 | 1    |
| C319   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C420   | C, CERAMIC  | 50 V  | 10    | PF+-0.5PF  | CCC1002 | 1    |
| C421   | C, CERAMIC  | 500 V | 33    | PF+5%      | CCC1225 | 1    |
| C424   | C, CERAMIC  | 50 V  | 5     | PF+-0.25PF | CCC0999 | 1    |
| C425   | C, CERAMIC  | 50 V  | 39    | PF+-5%     | CCC1013 | 1    |
| C426   | C, CERAMIC  | 50 V  | 330   | PF+-10%    | CCC1160 | 1    |
| C429   | C, CERAMIC  | 50 V  | 5     | PF+-0.25PF | CCC0999 | 1    |
| C421A  | C, CERAMIC  | 50 V  | 5     | PF+-0.25PF | CCC0999 | 1    |
| C431   | C, CERAMIC  | 500 V | 1000  | PF+-10%    | CCD0217 | 1    |
| C432   | C, PLASTIC  | 600 V | 22000 | PF+-10%    | CQX0071 | 1    |
| C437   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C438   | C, CERAMIC  | 50 V  | 10000 | PF+80%-20% | CCC1030 | 1    |
| C439   | C, AL ELYC  | 25 V  | 10    | UF         | CEC0175 | 1    |
| C443   | C, PLASTIC  | 50 V  | 47000 | PF+-10%    | CQA0101 | 1    |

| Simbol | Description |     |   |       | Code       | Q'ty    |   |
|--------|-------------|-----|---|-------|------------|---------|---|
| C444   | C, CERAMIC  | 50  | V | 1     | PF+-0.25PF | CCC1133 | 1 |
| C445   | C, CERAMIC  | 50  | V | 22    | PF+-5%     | CCC1007 | 1 |
| C446   | C, PLASTIC  | 50  | V | 47000 | PF+-10%    | CQA0101 | 1 |
| C447   | C, CERAMIC  | 50  | V | 10000 | PF+80%-20% | CCC1030 | 1 |
| C447A  | C, CERAMIC  | 50  | V | 10000 | PF+80%-20% | CCC1030 | 1 |
| C451   | C, CERAMIC  | 50  | V | 10000 | PF+80%-20% | CCC1030 | 1 |
| C453   | C, CERAMIC  | 50  | V | 10000 | PF+80%-20% | CCC1030 | 1 |
| C455   | C, CERAMIC  | 50  | V | 47    | PF+-10%    | CCC1014 | 1 |
| C456   | C, AL ELYC  | 50  | V | 1     | UF B1-POLE | CET0031 | 1 |
| C457   | C, AL ELYC  | 25  | V | 10    | UF NP      | CEC0176 | 1 |
| C458   | C, CERAMIC  | 50  | V | 1000  | PF+-10%    | CCC1029 | 1 |
| C462   | C, CERAMIC  | 50  | V | 2     | PF+-0.25PF | CCC0996 | 1 |
| C463   | C, CERAMIC  | 50  | V | 2     | PF+-0.25PF | CCC0996 | 1 |
| C465   | C, PLASTIC  | 50  | V | 4700  | PF+-10%    | CQA0095 | 1 |
| C468   | C, PLASTIC  | 50  | V | 4700  | PF+-10%    | CQA0095 | 1 |
| C470   | C, PLASTIC  | 50  | V | 10000 | PF+-10%    | CCC1030 | 1 |
| C471   | C, PLASTIC  | 50  | V | 1000  | PF+-10%    | CQA0091 | 1 |
| C476   | C, CERAMIC  | 50  | V | 47    | PF+-10%    | CCC1014 | 1 |
| C483   | C, CERAMIC  | 50  | V | 100   | PF+-10%    | CCC1025 | 1 |
| C487   | C, AL ELYC  | 25  | V | 10    | UF         | CEC0175 | 1 |
| C488   | C, AL ELYC  | 16  | V | 47    | UF         | CEC0170 | 1 |
| C489   | C, AL ELYC  | 25  | V | 10    | UF         | CEC0175 | 1 |
| C490   | C, CERAMIC  | 50  | V | 10000 | PF+80%-20% | CCC1030 | 1 |
| C492   | C, CERAMIC  | 50  | V | 10000 | PF+80%-20% | CCC1030 | 1 |
| C492A  | C, PLASTIC  | 50  | V | 10000 | PF+-10%    | CQA0097 | 1 |
| C493   | C, CERAMIC  | 50  | V | 10000 | PF+80%-20% | CCC1030 | 1 |
| C494   | C, AL ELYC  | 25  | V | 10    | UF         | CEC0175 | 1 |
| C496   | C, AL ELYC  | 25  | V | 10    | UF NP      | CEC0176 | 1 |
| C601   | C, CERAMIC  | 500 | V | 33    | PF+-5%     | CCC1225 | 1 |
| C603   | C, CERAMIC  | 500 | V | 10    | PF+-10%    | CCC0772 | 1 |



| Simbol | Description |                 |                  |            | Code      | Q'ty |
|--------|-------------|-----------------|------------------|------------|-----------|------|
| C606   | C,PLASTIC   | 600             | V22000           | PF+-10%    | CQX0071   | 1    |
| C607   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C608   | C,AL ELYC   | 25              | V 10             | UF         | CEC0175   | 1    |
| C609   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C610   | C,AL ELYC   | 25              | V 10             | UF         | CEC0175   | 1    |
| C612   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C617   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C618   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C619   | C,CERAMIC   | 50              | V 47             | PF+-10%    | CCC1014   | 1    |
| C622   | C,AL ELYC   | 50              | V 1              | UF         | CET0031   | 1    |
| C633   | C,CERAMIC   | 50              | V 12             | PF+-0.5PF  | CCC1003   | 1    |
| C634   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C641   | C,CERAMIC   | 50              | V 47             | PF+-10%    | CCC1014   | 1    |
| C652   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C693   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C694   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C694A  | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| C695   | C,CERAMIC   | 50              | V10000           | PF+80%-20% | CCC1030   | 1    |
| CV423  | C,VARIABLE  | ECV-1ZW 20 × 93 |                  |            | HX3142155 | 1    |
| CV603  | C,VARIABLE  | ECV-1ZW 20 × 93 |                  |            | HX3142155 | 1    |
| D211   | DIODE       | 1S2075K         |                  |            | HDS0108   | 1    |
| D311   | DIODE       | 1S2075K         |                  |            | HDS0108   | 1    |
| D431   | DIODE       | 1S2075          | T-D              |            | HDS0108   | 1    |
| D432   | DIODE       | 1S2075          | T-D              |            | HDS0108   | 1    |
| D434   | DIODE       | MA161           |                  |            | HDM0051   | 1    |
| D435   | DIODE       | 1S2075          | T-D              |            | HDS0108   | 1    |
| D436   | DIODE       | 1S2075          | T-D              |            | HDS0108   | 1    |
| D447A  | DIODE       | 1S2075          | T-D              |            | HDS0108   | 1    |
| D470   | DIODE       | 1S2075          | T-D              |            | HDS0108   | 1    |
| D488   | DIODE       | SR503D          | WITH MOUNT (RED) |            | HDS0408   | 1    |

| Simbol | Description |            |      | Code    | Q'ty |
|--------|-------------|------------|------|---------|------|
| D490   | DIODE       | 1S2075     | T-D  | HDS0108 | 1    |
| D491   | DIODE       | 1S2075     | T-D  | HDS0108 | 1    |
| D492   | DIODE       | 1S2075     | T-D  | HDS0108 | 1    |
| D607   | DIODE       | MA161      |      | HDM0051 | 1    |
| D608   | DIODE       | 1S2075     | T-D  | HDS0108 | 1    |
| D609   | DIODE       | 1S2075     | T-D  | HDS0108 | 1    |
| D612   | DIODE       | 1S2075     | T-D  | HDS0108 | 1    |
| D692   | DIODE       | 1S2075     | T-D  | HDS0108 | 1    |
| IC430  | IC, ANALOG  | TL071CP    |      | ILT0041 | 1    |
| IC450  | IC, ANALOG  | CA3102E    |      | ILC0069 | 1    |
| IC460  | DIGITAL IC  | HD10131    |      | IDH0008 | 1    |
| IC461  | IC          | HD10116    |      | IDH0005 | 1    |
| IC462  | DIGITAL IC  | HD10102    |      | IDH0002 | 1    |
| IC463  | IC          | HA17901P   |      | ILH0096 | 1    |
| IC470  | ANALOG IC   | HA17741PS  |      | ILH0088 | 1    |
| IC620  | IC, ANALOG  | CA3102E    |      | ILC0069 | 1    |
| IC621  | IC          | HD10116    |      | IDH0005 | 1    |
| IC622  | DIGITAL IC  | HD10102    |      | IDH0002 | 1    |
| IC623  | DIGITAL IC  | HD10131    |      | IDH0008 | 1    |
| IC651  | DIGITAL IC  | HD10102    |      | IDH0002 | 1    |
| L212   | COIL        | FL-5H      | 330K | TLF0019 | 1    |
| L458   | COIL        | FL-3H      | R22M | TLF0003 | 1    |
| L459   | COIL        | FL-3H      | R22M | TLF0003 | 1    |
| L623   | COIL        | FL-3H      | R22M | TLF0003 | 1    |
| L624   | COIL        | FL-3H      | R22M | TLF0003 | 1    |
| P400   | CONNECTOR   | 1-171826-0 |      | JBX1712 | 1    |
| P401   | CONNECTOR   | 171825-4   |      | JBX0704 | 1    |
| P402   | CONNECTOR   | 171825-4   |      | JBX0704 | 1    |
| P403   | CONNECTOR   | 171825-4   |      | JBX0704 | 1    |
| P404   | CONNECTOR   | 171825-4   |      | JBX0704 | 1    |

| Simbol | Description |             |      |           | Code     | Q'ty |
|--------|-------------|-------------|------|-----------|----------|------|
| P410   | CONNECTOR   | 171826-3    |      |           | JBX1710  | 1    |
| P422   | CONNECTOR   | 171825-3    |      |           | JBX0468  | 1    |
| P460   | CONNECTOR   | 171826-6    |      |           | JBX1711  | 1    |
| P488   | CONNECTOR   | 171826-3    |      |           | JBX1710  | 1    |
| P602   | CONNECTOR   | 171825-3    |      |           | JBX0468  | 1    |
| PEF496 | PCB         | PEF-496-497 |      |           | H 116457 | R    |
| R201   | R, METAL    | 1/4W        | 100  | OHM +-1%  | RME0652  | 1    |
| R201B  | R, METAL    | 1/4W        | 100  | OHM +-1%  | RME0652  | 1    |
| R202   | R, CARBON   | 1/4W        | 1.0  | KOHM +-5% | RCR3052  | 1    |
| R203   | R, METAL    | 1/4W        | 121  | OHM +-1%  | RME0653  | 1    |
| R204   | R, METAL    | 1/4W        | 1.21 | KOHM +-1% | RME0665  | 1    |
| R205   | R, METAL    | 1/4W        | 1.21 | KOHM +-1% | RME0665  | 1    |
| R206   | R, CARBON   | 1/4W        | 270  | OHM +-5%  | RCR3038  | 1    |
| R207   | R, CARBON   | 1/4W        | 150  | OHM +-5%  | RCR3032  | 1    |
| R208   | R, CARBON   | 1/4W        | 390  | OHM +-5%  | RCR3042  | 1    |
| R206A  | R, METAL    | 1/4W        | 2.43 | KOHM +-1% | RME0799  | 1    |
| R211   | R, CARBON   | 1/4W        | 270  | OHM +-5%  | RCR3038  | 1    |
| R214   | R, METAL    | 1/4W        | 392  | OHM +-1%  | RME0659  | 1    |
| R215   | R, CARBON   | 1/4W        | 47   | OHM +-5%  | RCR3020  | 1    |
| R216   | R, CARBON   | 1/4W        | 47   | OHM +-5%  | RCR3020  | 1    |
| R217   | R, CARBON   | 1/4W        | 1.5  | KOHM +-5% | RCR3056  | 1    |
| R219   | R, CARBON   | 1/4W        | 1.5  | KOHM +-5% | RCR3056  | 1    |
| R220   | R, CARBON   | 1/4W        | 22   | OHM +-5%  | RCR3012  | 1    |
| R301   | R, METAL    | 1/4W        | 100  | OHM +-1%  | RME0652  | 1    |
| R301B  | R, METAL    | 1/4W        | 100  | OHM +-1%  | RME0652  | 1    |
| R302   | R, CARBON   | 1/4W        | 1.0  | KOHM +-5% | RCR3052  | 1    |
| R303   | R, METAL    | 1/4W        | 121  | OHM +-1%  | RME0653  | 1    |
| R304   | R, METAL    | 1/4W        | 1.21 | KOHM +-1% | RME0665  | 1    |
| R305   | R, METAL    | 1/4W        | 1.21 | KOHM +-1% | RME0665  | 1    |
| R306   | R, CARBON   | 1/4W        | 220  | OHM +-5%  | RCR3036  | 1    |

| Simbol | Description |      |      |           | Code    | Q'ty |
|--------|-------------|------|------|-----------|---------|------|
| R307   | R, CARBON   | 1/4W | 150  | OHM +-5%  | RCR3032 | 1    |
| R311   | R, CARBON   | 1/4W | 270  | OHM +-5%  | RCR3038 | 1    |
| R314   | R, METAL    | 1/4W | 392  | OHM +-1%  | RME0659 | 1    |
| R315   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R316   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R317   | R, CARBON   | 1/4W | 1.5  | KOHM +-5% | RCR3056 | 1    |
| R319   | R, CARBON   | 1/4W | 1.8  | KOHM +-5% | RCR3058 | 1    |
| R320   | R, CARBON   | 1/4W | 22   | OHM +-5%  | RCR3012 | 1    |
| R421   | R, CARBON   | 1/4W | 180  | OHM +-5%  | RCR3034 | 1    |
| R421A  | R, SOLID    | 1/4W | 10   | MOHM +-5% | RSE0434 | 1    |
| R422   | R, CARBON   | 1/4W | 470  | KOHM +-5% | RCR3104 | 1    |
| R423   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R424   | R, CARBON   | 1/4W | 470  | KOHM +-5% | RCR3104 | 1    |
| R425   | R, CARBON   | 1/4W | 1.2  | KOHM +-5% | RCR3054 | 1    |
| R426   | R, CARBON   | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R427   | R, METAL    | 1/4W | 267  | OHM +-1%  | RME0657 | 1    |
| R427A  | R, CARBON   | 1/4W | 56   | KOHM +-5% | RCR3094 | 1    |
| R428   | R, CARBON   | 1/4W | 150  | OHM +-5%  | RCR3032 | 1    |
| R429   | R, CARBON   | 1/4W | 330  | OHM +-5%  | RCR3040 | 1    |
| R429A  | R, METAL    | 1/4W | 2.21 | KOHM +-1% | RME0668 | 1    |
| R429B  | R, METAL    | 1/4W | 2.21 | KOHM +-1% | RME0668 | 1    |
| R429C  | R, METAL    | 1/4W | 100  | OHM +-1%  | RME0652 | 1    |
| R429D  | R, METAL    | 1/4W | 100  | OHM +-1%  | RME0652 | 1    |
| R430   | R, CARBON   | 1/4W | 3.3  | KOHM +-5% | RCR3064 | 1    |
| R431   | R, METAL    | 1/4W | 392  | KOHM +-1% | RME0722 | 1    |
| R431A  | R, CARBON   | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R432   | R, METAL    | 1/4W | 100  | KOHM +-1% | RME0688 | 1    |
| R433   | R, SOLID    | 1/4W | 10   | MOHM +-5% | RSE0434 | 1    |
| R434   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R435   | R, CARBON   | 1/4W | 6.8  | KOHM +-5% | RCR3072 | 1    |

| Simbol | Description |      |      |           | Code    | Q'ty |
|--------|-------------|------|------|-----------|---------|------|
| R436   | R, CARBON   | 1/4W | 10   | KOHM +-5% | RCR3076 | 1    |
| R437   | R, CARBON   | 1/4W | 330  | OHM +-5%  | RCR3040 | 1    |
| R438   | R, CARBON   | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R439   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R440   | R, CARBON   | 1/4W | 6.8  | KOHM +-5% | RCR3072 | 1    |
| R440B  | R, CARBON   | 1/4W | 15   | KOHM +-5% | RCR3080 | 1    |
| R441   | R, CARBON   | 1/4W | 15   | KOHM +-5% | RCR3080 | 1    |
| R442   | R, METAL    | 1/4W | 100  | KOHM +-1% | RME0688 | 1    |
| R443   | R, CARBON   | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R444   | R, METAL    | 1/4W | 365  | KOHM +-1% | RME0697 | 1    |
| R445   | R, CARBON   | 1/4W | 33   | OHM +-5%  | RCR3016 | 1    |
| R446   | R, CARBON   | 1/4W | 560  | OHM +-5%  | RCR3046 | 1    |
| R447   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R448   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R449   | R, CARBON   | 1/4W | 150  | OHM +-5%  | RCR3032 | 1    |
| R450   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R450A  | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R451   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R451A  | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R452   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R452A  | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R453   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R453A  | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R454   | R, METAL    | 1/4W | 1.00 | KOHM +-1% | RME0664 | 1    |
| R455   | R, CARBON   | 1/4W | 22   | OHM +-5%  | RCR3012 | 1    |
| R456   | R, CARBON   | 1/4W | 220  | OHM +-5%  | RCR3036 | 1    |
| R456A  | R, CARBON   | 1/4W | 6.8  | OHM +-5%  | RCR3003 | 1    |
| R457   | R, CARBON   | 1/4W | 3.3  | KOHM +-5% | RCR3064 | 1    |
| R447A  | R, CARBON   | 1/4W | 10   | KOHM +-5% | RCR3076 | 1    |
| R458   | R, CARBON   | 1/4W | 820  | OHM +-5%  | RCR3050 | 1    |

| Simbol | Description |      |     |           | Code    | Q'ty |
|--------|-------------|------|-----|-----------|---------|------|
| R458A  | R,METAL     | 1/4W | 121 | OHM +-1%  | RME0653 | 1    |
| R459   | R,CARBON    | 1/4W | 820 | OHM +-5%  | RCR3050 | 1    |
| R459A  | R,METAL     | 1/4W | 121 | OHM +-1%  | RME0653 | 1    |
| R462   | R,METAL     | 1/4W | 221 | OHM +-1%  | RME0656 | 1    |
| R463   | R,METAL     | 1/4W | 221 | OHM +-1%  | RME0656 | 1    |
| R464   | R,CARBON    | 1/4W | 470 | OHM +-5%  | RCR3044 | 1    |
| R464A  | R,CARBON    | 1/4W | 100 | OHM +-5%  | RCR3028 | 1    |
| R465   | R,CARBON    | 1/4W | 470 | OHM +-5%  | RCR3044 | 1    |
| R466   | R,CARBON    | 1/4W | 680 | OHM +-5%  | RCR3048 | 1    |
| R467   | R,CARBON    | 1/4W | 680 | OHM +-5%  | RCR3048 | 1    |
| R468   | R,CARBON    | 1/4W | 2.2 | KOHM +-5% | RCR3060 | 1    |
| R469   | R,CARBON    | 1/4W | 1.5 | KOHM +-5% | RCR3056 | 1    |
| R469A  | R,METAL     | 1/4W | 392 | KOHM +-1% | RME0722 | 1    |
| R469B  | R,CARBON    | 1/4W | 1.5 | KOHM +-5% | RCR3056 | 1    |
| R470   | R,CARBON    | 1/4W | 10  | OHM +-5%  | RCR3004 | 1    |
| R470A  | R,CARBON    | 1/4W | 680 | KOHM +-5% | RCR3105 | 1    |
| R470B  | R,CARBON    | 1/4W | 4.7 | KOHM +-5% | RCR3068 | 1    |
| R470C  | R,CARBON    | 1/4W | 3.3 | KOHM +-5% | RCR3064 | 1    |
| R471   | R,CARBON    | 1/4W | 1.0 | KOHM +-5% | RCR3052 | 1    |
| R472   | R,CARBON    | 1/4W | 100 | KOHM +-5% | RCR3100 | 1    |
| R473   | R,CARBON    | 1/4W | 680 | OHM +-5%  | RCR3048 | 1    |
| R473A  | R,CARBON    | 1/4W | 47  | OHM +-5%  | RCR3020 | 1    |
| R474   | R,METAL     | 1/4W | 475 | OHM +-1%  | RME0660 | 1    |
| R475   | R,CARBON    | 1/4W | 10  | OHM +-5%  | RCR3004 | 1    |
| R476   | R,CARBON    | 1/4W | 10  | OHM +-5%  | RCR3004 | 1    |
| R477   | R,CARBON    | 1/4W | 470 | OHM +-5%  | RCR3044 | 1    |
| R478   | R,CARBON    | 1/4W | 820 | OHM +-5%  | RCR3050 | 1    |
| R479   | R,CARBON    | 1/4W | 820 | OHM +-5%  | RCR3050 | 1    |
| R480   | R,CARBON    | 1/4W | 1.0 | KOHM +-5% | RCR3052 | 1    |
| R481   | R,CARBON    | 1/4W | 1.0 | KOHM +-5% | RCR3052 | 1    |

| Simbol | Description |      |     |           | Code    | Q'ty |
|--------|-------------|------|-----|-----------|---------|------|
| R482   | R, CARBON   | 1/4W | 220 | OHM +-5%  | RCR3036 | 1    |
| R483   | R, SOLID    | 1/4W | 10  | MOHM +-5% | RSE0434 | 1    |
| R484   | R, CARBON   | 1/4W | 1.0 | KOHM +-5% | RCR3052 | 1    |
| R485   | R, CARBON   | 1/4W | 100 | OHM +-5%  | RCR3028 | 1    |
| R487   | R, CARBON   | 1/4W | 3.3 | KOHM +-5% | RCR3064 | 1    |
| R488   | R, CARBON   | 1/4W | 10  | KOHM +-5% | RCR3076 | 1    |
| R489   | R, CARBON   | 1/4W | 470 | OHM +-5%  | RCR3044 | 1    |
| R490   | R, CARBON   | 1/4W | 6.8 | OHM +-5%  | RCR3003 | ;    |
| R491   | R, CARBON   | 1/4W | 4.7 | KOHM +-5% | RCR3068 | 1    |
| R492   | R, CARBON   | 1/4W | 6.8 | OHM +-5%  | RCR3003 | 1    |
| R492A  | R, CARBON   | 1/4W | 6.8 | OHM +-5%  | RCR3003 | 1    |
| R493   | R, CARBON   | 1/4W | 6.8 | OHM +-5%  | RCR3003 | 1    |
| R494   | R, CARBON   | 1/4W | 6.8 | KOHM +-5% | RCR3072 | 1    |
| R495   | R, CARBON   | 1/4W | 2.2 | KOHM +-5% | RCR3060 | 1    |
| R496   | R, CARBON   | 1/4W | 22  | OHM +-5%  | RCR3012 | 1    |
| R496A  | R, CARBON   | 1/4W | 470 | OHM +-5%  | RCR3044 | 1    |
| R497   | R, CARBON   | 1/4W | 100 | KOHM +-5% | RCR3100 | 1    |
| R498   | R, CARBON   | 1/4W | 4.7 | KOHM +-5% | RCR3068 |      |
| R498A  | R, CARBON   | 1/4W | 100 | KOHM +-5% | RCR3100 | 1    |
| R499   | R, CARBON   | 1/4W | 100 | KOHM +-5% | RCR3100 | 1    |
| R499A  | R, CARBON   | 1/4W | 220 | KOHM +-5% | RCR3102 | 1    |
| R499B  | R, CARBON   | 1/4W | 3.3 | KOHM +-5% | RCR3064 | 1    |
| R601   | R, CARBON   | 1/4W | 100 | OHM +-5%  | RCR3028 | 1    |
| R602   | R, CARBON   | 1/4W | 470 | KOHM +-5% | RCR3104 | 1    |
| R603   | R, CARBON   | 1/4W | 100 | OHM +-5%  | RCR3028 | 1    |
| R606   | R, CARBON   | 1/4W | 470 | KOHM +-5% | RCR3104 | 1    |
| R607   | R, CARBON   | 1/4W | 47  | OHM +-5%  | RCR3020 | 1    |
| R608   | R, CARBON   | 1/4W | 330 | OHM +-5%  | RCR3040 | 1    |
| R609   | R, CARBON   | 1/4W | 100 | OHM +-5%  | RCR3028 | 1    |
| R610   | R, CARBON   | 1/4W | 6.8 | KOHM +-5% | RCR3072 | 1    |

| Simbol | Description |      |      |           | Code    | Q'ty |
|--------|-------------|------|------|-----------|---------|------|
| R612   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R612A  | R, CARBON   | 1/4W | 10   | KOHM +-5% | RCR3076 | 1    |
| R613   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| T614   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R615   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R616   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R617   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R617A  | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R618   | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R618A  | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R619   | R, CARBON   | 1/4W | 22   | OHM +-5%  | RCR3012 | 1    |
| R620   | R, METAL    | 1/4W | 1.00 | KOHM +-1% | RME0664 | 1    |
| R621   | R, CARBON   | 1/4W | 3.9  | KOHM +-5% | RCR3066 | 1    |
| R622   | R, CARBON   | 1/4W | 390  | OHM +-5%  | RCR3042 | 1    |
| R622A  | R, CARBON   | 1/4W | 6.8  | KOHM +-5% | RCR3072 | 1    |
| R622B  | R, CARBON   | 1/4W | 6.8  | OHM +-5%  | RCR3003 | 1    |
| R623   | R, CARBON   | 1/4W | 820  | OHM +-5%  | RCR3050 | 1    |
| R623A  | R, METAL    | 1/4W | 121  | OHM +-1%  | RME0653 | 1    |
| R624   | R, CARBON   | 1/4W | 820  | OHM +-5%  | RCR3050 | 1    |
| R624A  | R, METAL    | 1/4W | 121  | OHM +-1%  | RME0653 | 1    |
| R625   | R, METAL    | 1/4W | 221  | OHM +-1%  | RME0656 | 1    |
| R626   | R, METAL    | 1/4W | 221  | OHM +-1%  | RME0656 | 1    |
| R627   | R, CARBON   | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R628   | R, CARBON   | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R629   | R, CARBON   | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R631   | R, CARBON   | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R632   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R633   | R, CARBON   | 1/4W | 150  | OHM +-5%  | RCR3032 | 1    |
| R633A  | R, METAL    | 1/4W | 267  | OHM +-1%  | RME0657 | 1    |
| R633B  | R, CARBON   | 1/4W | 68   | OHM +-5%  | RCR3024 | R    |



| Simbol | Description |      |      |           | Code    | Q'ty |
|--------|-------------|------|------|-----------|---------|------|
| R633C  | R, METAL    | 1/4W | 2.21 | KOHM +-1% | RME0668 | 1    |
| R633D  | R, METAL    | 1/4W | 2.21 | KOHM +-1% | RME0668 | 1    |
| R633E  | R, METAL    | 1/4W | 100  | OHM +-1%  | RME0652 | 1    |
| R633F  | R, METAL    | 1/4W | 100  | OHM +-1%  | RME0652 | 1    |
| R634   | R, CARBON   | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R634A  | R, CARBON   | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R635   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R638   | R, CARBON   | 1/4W | 330  | OHM +-5%  | RCR3040 | 1    |
| R640   | R, METAL    | 1/4W | 475  | OHM +-1%  | RME0660 | 1    |
| R641   | R, CARBON   | 1/4W | 10   | OHM +-5%  | RCR3004 | 1    |
| R642   | R, CARBON   | 1/4W | 10   | OHM +-5%  | RCR3004 | 1    |
| R643   | R, CARBON   | 1/4W | 470  | OHM +-5%  | RCR3044 | 1    |
| R644   | R, CARBON   | 1/4W | 820  | OHM +-5%  | RCR3050 | 1    |
| R645   | R, CARBON   | 1/4W | 820  | OHM +-5%  | RCR3050 | 1    |
| R646   | R, CARBON   | 1/4W | 10   | KOHM +-5% | RCR3076 | 1    |
| R647   | R, CARBON   | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R648   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R649   | R, CARBON   | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R650   | R, CARBON   | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R651   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R652   | R, CARBON   | 1/4W | 6.8  | OHM +-5%  | RCR3003 | 1    |
| R653   | R, CARBON   | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R655   | R, CARBON   | 1/4W | 6.8  | KOHM +-5% | RCR3072 | 1    |
| R663   | R, CARBON   | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R690   | R, CARBON   | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R691   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R692   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R693   | R, CARBON   | 1/4W | 6.8  | OHM +-5%  | RCR3003 | 1    |
| R694   | R, CARBON   | 1/4W | 6.8  | OHM +-5%  | RCR3003 | 1    |
| R694A  | R, CARBON   | 1/4W | 6.8  | OHM +-5%  | RCR3003 | 1    |

| Simbol | Description |               |     |           | Code      | Q'ty |
|--------|-------------|---------------|-----|-----------|-----------|------|
| R695   | R, CARBON   | 1/4W          | 6.8 | OHM +-5%  | RCR3003   | 1    |
| R698   | R, CARBON   | 1/4W          | 1.0 | KOHM +-5% | RCR3052   | 1    |
| R699   | R, CARBON   | 1/4W          | 1.0 | KOHM +-5% | RCR3052   | 1    |
| RV208  | VR, METAL   | CR29R         | 100 | OHM       | HX8348450 | 1    |
| RV211  | VR, METAL   | CR29R         | 100 | OHM       | HX8348450 | 1    |
| RV311  | VR, METAL   | CR29R         | 100 | OHM       | HX8348450 | 1    |
| RV440  | VR, CARBON  | EVH-Y13K20B14 |     |           | RDE0003   | 1    |
| RV441  | VR, METAL   | CR29R         | 10  | KOHM      | HX8348450 | 1    |
| RV621  | VR, CARBON  | EVH-Y13K20B14 |     |           | RDE0003   | 1    |
| RV622A | VR, METAL   | CR29R         | 10  | KOHM      | HX8348450 | 1    |
| S401   | SW, LEVER   | SLA225        |     |           | SSL0056   | 1    |
| S402   | SW, LEVER   | SLA225        |     |           | SSL0056   | 1    |
| S403   | SW, LEVER   | SLA225        |     |           | SSL0056   | 1    |
| S404   | SW, PUSH    | UEG22         |     |           | HX8311793 | 1    |
| S601   | SW, LEVER   | SLA225        |     |           | SSL0056   | 1    |
| TR204  | TRANSISTOR  | 2SC641K-C     |     |           | HTC0192   | 1    |
| TR205  | TRANSISTOR  | 2SC641K-C     |     |           | HTC0192   | 1    |
| TR206  | TRANSISTOR  | 2SA1029 D     |     |           | HTA0224   | 1    |
| TR214  | TRANSISTOR  | 2SA781K       |     |           | HTA0099   | 1    |
| TR304  | TRANSISTOR  | 2SC641K-C     |     |           | HTC0192   | 1    |
| TR305  | TRANSISTOR  | 2SC641K-C     |     |           | HTC0192   | 1    |
| TR314  | TRANSISTOR  | 2SA781K       |     |           | HTA0099   | 1    |
| TR435  | TRANSISTOR  | 2SK106C       |     |           | HTK0068   | 1    |
| TR439  | TRANSISTOR  | 2SC1906       |     |           | HTC0338   | 1    |
| TR447  | TRANSISTOR  | 2SC1906       |     |           | HTC0338   | 1    |
| TR449  | TRANSISTOR  | 2SC1906       |     |           | HTC0338   | 1    |
| TR450  | TRANSISTOR  | 2SC1906       |     |           | HTC0338   | 1    |
| TR475  | TRANSISTOR  | 2SA781K       |     |           | HTA0099   | 1    |
| TR476  | TRANSISTOR  | 2SA781K       |     |           | HTA0099   | 1    |
| TR494  | TRANSISTOR  | 2SA1029 D     |     |           | HTA0224   | 1    |

| Simbol | Description          | Code    | Q'ty |
|--------|----------------------|---------|------|
| TR495  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR498  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR607  | TRANSISTOR 2SK106C   | HTK0068 | 1    |
| TR609  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR639  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR640  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR641  | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR642  | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR647  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-497)

| Simbol | Description |     |          |            | Code      | Q'ty |
|--------|-------------|-----|----------|------------|-----------|------|
| C501   | C, CERAMIC  | 50  | V 100    | PF+-10%    | CCC1025   | 1    |
| C503   | C, CERAMIC  | 50  | V10000   | PF+80%-20% | CCC1030   | 1    |
| C504A  | C, CERAMIC  | 50  | V 47     | PF+-5%     | CCC1014   | 1    |
| C506   | C, CERAMIC  | 50  | V10000   | PF+80%-20% | CCC1030   | 1    |
| C508   | C, CERAMIC  | 50  | V 47     | PF+-5%     | CCC1014   | 1    |
| C512   | C, CERAMIC  | 50  | V 220    | PF+-10%    | CCC1027   | 1    |
| C514   | C, AL ELYC  | 25  | V 22     | UF         | CEC0180   | 1    |
| C515   | C, CERAMIC  | 50  | V 10     | PF+-0.5PF  | CCC1002   | 1    |
| C516   | C, AL ELYC  | 16  | V 47     | UF         | CEC0170   | 1    |
| C517   | C, CERAMIC  | 50  | V 1000   | PF+80%-20% | CCC1029   | 1    |
| C523   | C, AL ELYC  | 160 | V 1      | UF         | CEC0213   | 1    |
| C525   | C, CERAMIC  | 50  | V10000   | PF+80%-20% | CCC1030   | 1    |
| C526   | C, CERAMIC  | 50  | V 33     | PF+-5%     | CCC1011   | 1    |
| C530   | C, CERAMIC  | 50  | V 27     | PF+-5%     | CCC1009   | 1    |
| C531   | C, PLASTIC  | 100 | V 1+0.01 | UF+-0.5%   | HX3142077 | 1    |
| C532   | C, PLASTIC  | 50  | V 4700   | PF+-10%    | CQA0095   | 1    |
| C533   | C, PLASTIC  | 100 | V 1+0.01 | UF+-0.5%   | HX3142077 | R    |
| C535   | C, CERAMIC  | 50  | V 47     | PF+-5%     | CCC1014   | 1    |
| C542   | C, AL ELYC  | 16  | V 47     | UF         | CEC0170   | 1    |
| C543   | C, CERAMIC  | 50  | V10000   | PF+80%-20% | CCC1030   | 1    |
| C544   | C, CERAMIC  | 50  | V10000   | PF+80%-20% | CCC1030   | 1    |
| C545   | C, AL ELYC  | 25  | V 22     | UF         | CEC0180   | 1    |
| C546   | C, AL ELYC  | 50  | V 2.2    | UF         | CEC0194   | 1    |
| C547   | C, PLASTIC  | 50  | V 0.1    | MF+-10%    | CQA0103   | 1    |
| C547A  | C, PLASTIC  | 50  | V 0.1    | UF+-10%    | CQA0103   | 1    |
| C548   | C, PLASTIC  | 50  | V22000   | PF+-10%    | CQA0099   | 1    |
| C549   | C, PLASTIC  | 50  | V 2200   | PF+-10%    | CQA0093   | 1    |
| C550   | C, CERAMIC  | 50  | V 220    | PF+-10%    | CCC1027   | 1    |
| C551   | C, CERAMIC  | 50  | V 100    | PF+-10%    | CCC1025   | 1    |
| C553   | C, AL ELYC  | 25  | V 10     | UF         | CEC0175   | 1    |

| Simbol | Description |     |   |        |            | Code      | Q'ty |
|--------|-------------|-----|---|--------|------------|-----------|------|
| C554   | C,AL ELYC   | 25  | V | 10     | UF         | CEC0175   | 1    |
| C555   | C,AL ELYC   | 16  | V | 47     | UF         | CEC0170   | 1    |
| C559   | C,AL ELYC   | 25  | V | 10     | UF         | CEC0175   | 1    |
| C569   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C585   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C587   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C588   | C,CERAMIC   | 50  | V | 1      | PF+-0.25PF | CCC1133   | 1    |
| C593   | C,AL ELYC   | 16  | V | 47     | UF         | CEC0170   | 1    |
| C594   | C,CERAMIC   | 50  | V | 1      | PF+-0.25PF | CCC1133   | 1    |
| C595   | C,AL ELYC   | 16  | V | 47     | UF         | CEC0170   | 1    |
| C703   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C704A  | C,CERAMIC   | 50  | V | 47     | PF+-5%     | CCC1014   | 1    |
| C706   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C708   | C,CERAMIC   | 50  | V | 47     | PF+-5%     | CCC1014   | 1    |
| C713   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C714   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C715   | C,CERAMIC   | 50  | V | 10     | PF+-0.5PF  | CCC1002   | 1    |
| C725   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C726   | C,CERAMIC   | 50  | V | 47     | PF+-5%     | CCC1014   | 1    |
| C730   | C,CERAMIC   | 50  | V | 27     | PF+-5%     | CCC1009   | 1    |
| C731   | C,PLASTIC   | 100 | V | 1+0.01 | UF+-0.5%   | HX3142077 | 1    |
| C732   | C,PLASTIC   | 50  | V | 4700   | PF+-10%    | CQA0095   | 1    |
| C733   | C,PLASTIC   | 100 | V | 1+0.01 | UF+-0.5%   | HX3142077 | R    |
| C735   | C,CERAMIC   | 50  | V | 47     | PF+-5%     | CCC1014   | 1    |
| C742   | C,CERAMIC   | 50  | V | 100    | PF+-10%    | CCC1025   | 1    |
| C743   |             |     |   |        |            |           |      |
| C744   |             |     |   |        |            |           |      |
| C760   | C,CERAMIC   | 50  | V | 10000  | PF+80%-20% | CCC1030   | 1    |
| C761   | C,CERAMIC   | 50  | V | 220    | PF+-10%    | CCC1027   | 1    |
| C763   | C,CERAMIC   | 50  | V | 220    | PF+-10%    | CCC1027   | 1    |

| Simbol | Description |              |            |  | Code      | Q'ty |
|--------|-------------|--------------|------------|--|-----------|------|
| C764   | C, CERAMIC  | 50 V 680     | PF+-1%     |  | CCC1365   | 1    |
| C765   | C, CERAMIC  | 50 V10000    | PF+80%-20% |  | CCC1030   | 1    |
| C766   | C, CERAMIC  | 50 V10000    | PF+80%-20% |  | CCC1030   | 1    |
| C768   | C, AL ELYC  | 25 V 10      | UF         |  | CEC0175   | 1    |
| C776   | C, AL ELYC  | 25 V 10      | UF         |  | CEC0175   | 1    |
| C780   | C, CERAMIC  | 50 V10000    | PF+80%-20% |  | CCC1030   | 1    |
| C782B  | C, CERAMIC  | 50 V 33      | PF+-5%     |  | CCC1011   | 1    |
| C791   | C, AL ELYC  | 16 V 47      | UF         |  | CEC0170   | 1    |
| CV530  | C, VARIABLE | ECV-1ZW10×93 |            |  | HX3142155 | 1    |
| CV534  | C, VARIABLE | ECV-1ZW20×93 |            |  | HX3142155 | 1    |
| CV730  | C, VARIABLE | ECV-1ZW10×93 |            |  | HX3142155 | 1    |
| CV734  | C, VARIABLE | ECV-1ZW20×93 |            |  | HX3142155 | 1    |
| CV782A | C, VARIABLE | ECV-1ZW50×93 |            |  | HX3142155 | 1    |
| D504   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D505   | DIODE       | MA161        |            |  | HDM0051   | 1    |
| D508   | DIODE       | MA161        |            |  | HDM0051   | 1    |
| D509   | DIODE       | MA161        |            |  | HDM0051   | 1    |
| D540A  | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D548   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D550   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D551   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D552   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D558   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D559   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D704   | DIODE       | 1S2075       | T-D        |  | HDS0108   | 1    |
| D705   | DIODE       | MA161        |            |  | HDM0051   | 1    |
| D708   | DIODE       | MA161        |            |  | HDM0051   | 1    |

| Simbol | Description |             |     | Code    | Q'ty |
|--------|-------------|-------------|-----|---------|------|
| D709   | DIODE       | MH161       |     | HDM0051 | 1    |
| D740A  | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D763   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D764   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D768   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D769   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D770   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D771   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D772   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D776   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D780   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D781   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D782   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D783   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D784   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D785   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| D786   | DIODE       | 1S2075      | T-D | HDS0108 | 1    |
| IC500  | IC, ANALOG  | TL081CP     |     | ILT0037 | 1    |
| IC501  | DIGITAL IC  | HD10102     |     | IDH0002 | 1    |
| IC502  | DIGITAL IC  | HD7400P     |     | IDH0177 | 1    |
| IC503  | IC, DIGITAL | HD74LS00P   |     | IDH0467 | 1    |
| IC505  | DIGITAL IC  | MC14053BCP  |     | IDM0113 | 1    |
| IC506  | IC, DIGITAL | HD74LS109AP |     | IDH0713 | 1    |
| L761   | COIL        | FL-5H 330K  |     | TLF0019 | 1    |
| L782A  | COIL        | FL-5H 330K  |     | TLF0019 | 1    |
| P500   | CONNECTOR   | 1-171826-0  |     | JBX1712 | 1    |
| P501   | CONNECTOR   | 171825-6    |     | JBX0470 | 1    |
| P503   | CONNECTOR   | 171826-6    |     | JBX1711 | 1    |
| P509   | CONNECTOR   | 171825-3    |     | JBX0468 | 1    |
| P546   | CONNECTOR   | 171825-6    |     | JBX0470 | 1    |

| Simbol | Description |             |      |           | Code     | Q'ty |
|--------|-------------|-------------|------|-----------|----------|------|
| P590   | CONNECTOR   | 171826-6    |      |           | JBX1711  | 1    |
| P591   | CONNECTOR   | 171825-3    |      |           | JBX0468  | 1    |
| P595   | CONNECTOR   | 171825-4    |      |           | JBX0704  | 1    |
| P767   | CONNECTOR   | 171826-6    |      |           | JBX1711  | 1    |
| PEF497 | PCB         | PEF-496~497 |      |           | H 116457 | 1    |
| PEF497 |             |             |      |           | H 291533 | R    |
| R501   | R, CARBON   | 1/4W        | 1.5  | KOHM +-5% | RCR3056  | 1    |
| R502   | R, METAL    | 1/4W        | 2.67 | KOHM +-1% | RME0669  | 1    |
| R503   | R, METAL    | 1/4W        | 6.81 | KOHM +-1% | RME0674  | 1    |
| R504   | R, CARBON   | 1/4W        | 680  | OHM +-5%  | RCR3048  | 1    |
| R504A  | R, CARBON   | 1/4W        | 330  | OHM +-5%  | RCR3040  | 1    |
| R505   | R, CARBON   | 1/4W        | 22   | KOHM +-5% | RCR3084  | 1    |
| R506   | R, CARBON   | 1/4W        | 22   | OHM +-5%  | RCR3012  | 1    |
| R507   | R, CARBON   | 1/4W        | 2.2  | KOHM +-5% | RCR3060  | 1    |
| R508   | R, CARBON   | 1/4W        | 680  | OHM +-5%  | RCR3048  | 1    |
| R509   | R, CARBON   | 1/4W        | 2.2  | KOHM +-5% | RCR3060  | 1    |
| R510   | R, CARBON   | 1/4W        | 22   | OHM +-5%  | RCR3012  | 1    |
| R512   | R, CARBON   | 1/4W        | 100  | OHM +-5%  | RCR3028  | 1    |
| R513   | R, SOLID    | 1/4W        | 10   | MOHM +-5% | RSE0434  | 1    |
| R514   | R, CARBON   | 1/4W        | 68   | OHM +-5%  | RCR3024  | 1    |
| R515   | R, CARBON   | 1/4W        | 6.8  | OHM +-5%  | RCR3003  | 1    |
| R516   | R, CARBON   | 1/4W        | 8.2  | KOHM +-5% | RCR3074  | 1    |
| R516A  | R, CARBON   | 1/4W        | 22   | OHM +-5%  | RCR3012  | 1    |
| R517   | R, CARBON   | 1/4W        | 4.7  | KOHM +-5% | RCR3068  | 1    |
| R518   | R, METAL    | 1/4W        | 22.1 | KOHM +-1% | RME0680  | 1    |
| R519   | R, METAL    | 1/4W        | 1.21 | KOHM +-1% | RME0665  | 1    |
| R520   | R, CARBON   | 1/4W        | 100  | OHM +-5%  | RCR3028  | 1    |
| R521   | R, CARBON   | 1/4W        | 47   | OHM +-5%  | RCR3020  | 1    |
| R522   | R, CARBON   | 1/4W        | 10   | KOHM +-5% | RCR3076  | 1    |
| R523   | R, CARBON   | 1/2W        | 10   | KOHM +-5% | RCR3183  | 1    |



| Simbol | Description |      |      |             | Code    | Q'ty |
|--------|-------------|------|------|-------------|---------|------|
| R525   | R, CARBON   | 1/4W | 2.2  | KOHM +-5%   | RCR3060 | 1    |
| R526   | R, CARBON   | 1/4W | 220  | OHM +-5%    | RCR3036 | 1    |
| R527   | R, METAL    | 1/4W | 2.21 | KOHM +-1%   | RME0668 | 1    |
| R528   | R, METAL    | 1/4W | 2.43 | KOHM +-1%   | RME0799 | 1    |
| R530   | R, METAL    | 1/2W | 4.32 | MOHM +-1%   | RMR3283 | 1    |
| R531   | R, METAL    | 1/2W | 1.43 | MOHM +-0.5% | RME0833 | 1    |
| R532   | R, METAL    | 1/2W | 715  | KOHM +-0.5% | RME0834 | 1    |
| R533   | R, METAL    | 1/4W | 429  | KOHM +-0.5% | RME0699 | 1    |
| R534   | R, METAL    | 1/4W | 143  | KOHM +-0.5% | RME0718 | 1    |
| R535   | R, METAL    | 1/4W | 71.5 | KOHM +-0.5% | RME0717 | 1    |
| R536   | R, METAL    | 1/4W | 71.5 | KOHM +-0.5% | RME0717 | 1    |
| R537   | R, CARBON   | 1/4W | 820  | OHM +-5%    | RCR3050 | 1    |
| R538   | R, METAL    | 1/4W | 17.8 | KOHM +-0.5% | RME0700 | 1    |
| R539   | R, METAL    | 1/4W | 17.8 | KOHM +-0.5% | RME0700 | 1    |
| R540   | R, METAL    | 1/4W | 6.81 | KOHM +-1%   | RME0674 | 1    |
| R540A  | R, CARBON   | 1/4W | 68   | KOHM +-5%   | RCR3096 | 1    |
| R541   | R, CARBON   | 1/4W | 330  | OHM +-5%    | RCR3040 | 1    |
| R542   | R, CARBON   | 1/4W | 2.2  | KOHM +-5%   | RCR3060 | 1    |
| R543   | R, CARBON   | 1/4W | 100  | OHM +-5%    | RCR3028 | 1    |
| R544   | R, CARBON   | 1/4W | 6.8  | OHM +-5%    | RCR3003 | 1    |
| R546   | R, CARBON   | 1/4W | 100  | KOHM +-5%   | RCR3100 | 1    |
| R547   | R, CARBON   | 1/4W | 8.2  | KOHM +-5%   | RCR3074 | 1    |
| R548   | R, CARBON   | 1/4W | 100  | OHM +-5%    | RCR3028 | 1    |
| R549   | R, CARBON   | 1/4W | 100  | OHM +-5%    | RCR3028 | 1    |
| R550   | R, CARBON   | 1/4W | 6.8  | KOHM +-5%   | RCR3072 | 1    |
| R551   | R, CARBON   | 1/4W | 68   | KOHM +-5%   | RCR3096 | 1    |
| R552   | R, CARBON   | 1/4W | 100  | KOHM +-5%   | RCR3100 | 1    |
| R553   | R, CARBON   | 1/4W | 22   | KOHM +-5%   | RCR3084 | 1    |
| R554   | R, CARBON   | 1/4W | 100  | OHM +-5%    | RCR3028 | 1    |
| R555   | R, CARBON   | 1/4W | 100  | OHM +-5%    | RCR3028 | 1    |

| Simbol | Description |      |      |           | Code    | Q'ty |
|--------|-------------|------|------|-----------|---------|------|
| R557   | R, CARBON   | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R558   | R, CARBON   | 1/2W | 10   | KOHM +-5% | RCR3183 | 1    |
| R558A  | R, CARBON   | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R559   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R560   | R, CARBON   | 1/4W | 10   | KOHM +-5% | RCR3076 | 1    |
| R561   | R, METAL    | 1/4W | 825  | OHM +-1%  | RME0663 | 1    |
| R562   | R, CARBON   | 1/4W | 6.8  | KOHM +-5% | RCR3072 | 1    |
| R563   | R, METAL    | 1/4W | 182  | OHM +-1%  | RME0655 | 1    |
| R565   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R566   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R567   | R, CARBON   | 1/4W | 3.9  | KOHM +-5% | RCR3066 | 1    |
| R568   | R, CARBON   | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R569   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R570   | R, CARBON   | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R571   | R, METAL    | 1/4W | 1.82 | KOHM +-1% | RME0667 | 1    |
| R572   | R, METAL    | 1/4W | 3.92 | KOHM +-1% | RME0671 | 1    |
| R580A  | R, METAL    | 1/4W | 3.32 | KOHM +-1% | RME0670 | 1    |
| R580B  | R, METAL    | 1/4W | 332  | OHM +-1%  | RME0658 | 1    |
| R581   | R, METAL    | 1/4W | 3.32 | KOHM +-1% | RME0670 | 1    |
| R582   | R, CARBON   | 1/4W | 10   | KOHM +-5% | RCR3076 | 1    |
| R583   | R, CARBON   | 1/4W | 10   | KOHM +-5% | RCR3076 | 1    |
| R584   | R, METAL    | 1/4W | 3.92 | KOHM +-1% | RME0671 | 1    |
| R585   | R, CARBON   | 1/4W | 47   | KOHM +-5% | RCR3092 | 1    |
| R586   | R, CARBON   | 1/4W | 22   | KOHM +-5% | RCR3084 | 1    |
| R587   | R, CARBON   | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R588   | R, METAL    | 1/4W | 1.21 | KOHM +-1% | RME0665 | 1    |
| R589   | R, METAL    | 1/4W | 825  | OHM +-1%  | RME0663 | 1    |
| R590   | R, CARBON   | 1/4W | 22   | OHM +-5%  | RCR3012 | 1    |
| R591   | R, METAL    | 1/4W | 3.32 | KOHM +-1% | RME0670 | 1    |
| R592A  | R, METAL    | 1/4W | 332  | OHM +-1%  | RME0658 | 1    |

| Simbol | Description |      |      |           | Code    | Q'ty |
|--------|-------------|------|------|-----------|---------|------|
| R592B  | R,METAL     | 1/4W | 332  | OHM +-1%  | RME0658 | 1    |
| R593   | R,CARBON    | 1/4W | 22   | OHM +-5%  | RCR3012 | 1    |
| R594   | R,METAL     | 1/4W | 1.21 | KOHM +-1% | RME0665 | 1    |
| R595   | R,METAL     | 1/4W | 825  | OHM +-1%  | RME0663 | 1    |
| R596   | R,CARBON    | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R597   | R,CARBON    | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R598   | R,CARBON    | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R599   | R,CARBON    | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R701   | R,METAL     | 1/4W | 1.50 | KOHM +-1% | RME0666 | 1    |
| R702   | R,METAL     | 1/4W | 2.67 | KOHM +-1% | RME0669 | 1    |
| R703   | R,METAL     | 1/4W | 6.81 | KOHM +-1% | RME0674 | 1    |
| R704   | R,CARBON    | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R704A  | R,CARBON    | 1/4W | 330  | OHM +-5%  | RCR3040 | 1    |
| R705   | R,CARBON    | 1/4W | 22   | KOHM +-5% | RCR3084 | 1    |
| R706   | R,CARBON    | 1/4W | 22   | OHM +-5%  | RCR3012 | 1    |
| R707B  | R,CARBON    | 1/4W | 220  | OHM +-5%  | RCR3036 | 1    |
| R708   | R,CARBON    | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R712   | R,CARBON    | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R713   | R,CARBON    | 1/4W | 22   | OHM +-5%  | RCR3012 | 1    |
| R714   | R,CARBON    | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R715   | R,CARBON    | 1/4W | 6.8  | OHM +-5%  | RCR3003 | 1    |
| R716   | R,CARBON    | 1/4W | 12   | KOHM +-5% | RCR3078 | 1    |
| R722   | R,CARBON    | 1/4W | 47   | OHM +-5%  | RCR3020 | 1    |
| R723   | R,CARBON    | 1/2W | 10   | KOHM +-5% | RCR3183 | 1    |
| R725   | R,CARBON    | 1/4W | 2.2  | KOHM +-5% | RCR3060 | 1    |
| R726   | R,CARBON    | 1/4W | 470  | OHM +-5%  | RCR3044 | 1    |
| R727   | R,METAL     | 1/4W | 2.21 | KOHM +-1% | RME0668 | 1    |
| R728   | R,METAL     | 1/4W | 1.82 | KOHM +-1% | RME0667 | 1    |
| R728A  | R,CARBON    | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R729   | R,CARBON    | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |

| Simbol | Description |      |      |             | Code    | Q'ty |
|--------|-------------|------|------|-------------|---------|------|
| R730   | R, METAL    | 1/2W | 1.43 | MOHM +-0.5% | RME0833 | 1    |
| R731   | R, METAL    | 1/2W | 715  | KOHM +-0.5% | RME0834 | 1    |
| R732   | R, METAL    | 1/4W | 429  | KOHM +-0.5% | RME0699 | 1    |
| R733   | R, METAL    | 1/4W | 143  | KOHM +-0.5% | RME0718 | 1    |
| R734   | R, METAL    | 1/4W | 71.5 | KOHM +-0.5% | RME0717 | 1    |
| R735   | R, METAL    | 1/4W | 71.5 | KOHM +-0.5% | RME0717 | 1    |
| R736   | R, CARBON   | 1/4W | 2.7  | KOHM +-5%   | RCR3062 | 1    |
| R737   | R, METAL    | 1/4W | 71.5 | KOHM +-0.5% | RME0717 | 1    |
| R738   | R, METAL    | 1/4W | 17.8 | KOHM +-0.5% | RME0700 | 1    |
| R739   | R, METAL    | 1/4W | 17.8 | KOHM +-0.5% | RME0700 | 1    |
| R740   | R, METAL    | 1/4W | 6.81 | KOHM +-1%   | RME0674 | 1    |
| R740A  | R, CARBON   | 1/4W | 68   | KOHM +-5%   | RCR3096 | 1    |
| R741   | R, METAL    | 1/4W | 1.00 | KOHM +-1%   | RME0664 | 1    |
| R742   | R, CARBON   | 1/4W | 3.9  | KOHM +-5%   | RCR3066 | 1    |
| R743   | R, CARBON   | 1/4W | 3.9  | KOHM +-5%   | RCR3066 | 1    |
| R744   | R, CARBON   | 1/4W | 3.9  | KOHM +-5%   | RCR3066 | 1    |
| R755   | R, CARBON   | 1/4W | 100  | OHM +-5%    | RCR3028 | 1    |
| R761   | R, CARBON   | 1/4W | 470  | OHM +-5%    | RCR3044 | 1    |
| R761A  | R, CARBON   | 1/4W | 220  | OHM +-5%    | RCR3036 | 1    |
| R762   | R, CARBON   | 1/4W | 15   | KOHM +-5%   | RCR3080 | 1    |
| R763   | R, CARBON   | 1/4W | 270  | OHM +-5%    | RCR3038 | 1    |
| R764   | R, CARBON   | 1/4W | 2.2  | KOHM +-5%   | RCR3060 | 1    |
| R766   | R, CARBON   | 1/4W | 10   | KOHM +-5%   | RCR3076 | 1    |
| R767   | R, CARBON   | 1/4W | 47   | OHM +-5%    | RCR3020 | 1    |
| R768   | R, CARBON   | 1/4W | 1.0  | KOHM +-5%   | RCR3052 | 1    |
| R769   | R, CARBON   | 1/4W | 10   | KOHM +-5%   | RCR3076 | 1    |
| R770   | R, CARBON   | 1/4W | 100  | OHM +-5%    | RCR3028 | 1    |
| R771   | R, CARBON   | 1/4W | 1.0  | KOHM +-5%   | RCR3052 | 1    |
| R772   | R, CARBON   | 1/4W | 10   | KOHM +-5%   | RCR3076 | 1    |
| R773   | R, CARBON   | 1/4W | 820  | OHM +-5%    | RCR3050 | 1    |

| Simbol | Description |           |           |           | Code        | Q'ty |
|--------|-------------|-----------|-----------|-----------|-------------|------|
| R774   | R, CARBON   | 1/4W      | 820       | OHM +-5%  | RCR3050     | 1    |
| R775   | R, CARBON   | 1/4W      | 820       | OHM +-5%  | RCR3050     | 1    |
| R776   | R, CARBON   | 1/4W      | 10        | KOHM +-5% | RCR3076     | 1    |
| R776B  | R, CARBON   | 1/4W      | 22        | OHM +-5%  | RCR3012     | 1    |
| R780   | R, METAL    | 1/4W      | 3.32      | KOHM +-1% | RME0670     | 1    |
| R780A  | R, CARBON   | 1/4W      | 10        | KOHM +-5% | RCR3076     | 1    |
| R781   | R, CARBON   | 1/4W      | 2.7       | KOHM +-5% | RCR3062     | 1    |
| R781A  | R, CARBON   | 1/4W      | 3.3       | KOHM +-5% | RCR3064     | 1    |
| R782A  | R, CARBON   | 1/4W      | 2.2       | KOHM +-5% | RCR3060     | 1    |
| R783A  | R, METAL    | 1/4W      | 392       | OHM +-1%  | RME0659     | 1    |
| R784   | R, METAL    | 1/4W      | 3.92      | KOHM +-1% | RME0671     | 1    |
| R785   | R, CARBON   | 1/4W      | 1.0       | KOHM +-5% | RCR3052     | 1    |
| R786   | R, CARBON   | 1/4W      | 1.0       | KOHM +-5% | RCR3052     | 1    |
| R791   | R, CARBON   | 1/4W      | 22        | OHM +-5%  | RCR3012     | 1    |
| R792   | R, CARBON   | 1/4W      | 3.3       | KOHM +-5% | RCR3064     | 1    |
| R793   | R, CARBON   | 1/4W      | 22        | KOHM +-5% | RCR3084     | 1    |
| R794   | R, CARBON   | 1/4W      | 3.3       | KOHM +-5% | RCR3064     | 1    |
| R795   | R, CARBON   | 1/4W      | 22        | OHM +-5%  | RCR3012     | 1    |
| RV540  | VR, METAL   | CR29R     | 470       | OHM       | HX8348450   | 1    |
| RV542  | VR, CARBON  | 1kB+500kB |           | WITH/SW   | HX3142080 B | 1    |
| RV560  | VR, METAL   | CR29R     | 2.2       | KOHM      | HX8348450   | 1    |
| RV562  | VR, METAL   | CR29R     | 2.2       | KOHM      | HX8348450   | 1    |
| RV714  | VR, METAL   | CR29R     | 470       | OHM       | HX8348450   | 1    |
| RV740  | VR, METAL   | CR29R     | 470       | OHM       | HX8348450   | 1    |
| RV742  | VR, METAL   | CR29R     | 220       | OHM       | HX8348450   | 1    |
| RV783A | VR, METAL   | CR29R     | 470       | OHM       | HX8348450   | 1    |
| S501   | SW, ROTARY  | S21P      | 3323/2220 |           | HX3142078 B | 1    |
| S770   | SW, LEVER   | SLA225    |           |           | SSL0056     | 1    |
| TR501  | TRANSISTOR  | 2SA1029   | D         |           | HTA0224     | 1    |
| TR502  | TRANSISTOR  | 2SA1029   | D         |           | HTA0224     | 1    |

| Simbol | Description          | Code    | Q'ty |
|--------|----------------------|---------|------|
| TR504  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR507  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR514  | TRANSISTOR 2SK106C   | HTK0068 | 1    |
| TR516  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR524  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR548  | TRANSISTOR 2SC458C   | HTC0148 | 1    |
| TR551  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR558  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR559  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR567  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR588  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR594  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR596  | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR599  | TRANSISTOR 2SA781K   | HTA0099 | 1    |
| TR701  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR702  | TRANSISTOR 2SA1029 D | HTA0224 | 1    |
| TR704  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR714  | TRANSISTOR 2SK106C   | HTK0068 | 1    |
| TR716  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR724  | TRANSISTOR 2SC1906   | HTC0338 | 1    |
| TR728  | TRANSISTOR 2SC458C   | HTC0148 | 1    |
| TR768  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR793  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |
| TR795  | TRANSISTOR 2SC641K-C | HTC0192 | 1    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-498)

| Simbol | Description |         |         |            | Code      | Q'ty |
|--------|-------------|---------|---------|------------|-----------|------|
| C319   | C, CERAMIC  | 50 V    | 47      | PF+-5%     | CCC1014   | 1    |
| C321   | C, AL ELYC  | 25 V    | 10      | UF         | CEC0175   | 1    |
| C326   | C, CERAMIC  | 50 V    | 2       | PF+-0.25PF | CCC0996   | 1    |
| C327   | C, AL ELYC  | 25 V    | 10      | UF         | CEC0175   | 1    |
| C329   | C, CERAMIC  | 50 V    | 680     | PF+-10%    | CCC1365   | 1    |
| C330   | C, CERAMIC  | 50 V    | 680     | PF+-10%    | CCC1365   | 1    |
| C333   | C, AL ELYC  | 25 V    | 10      | UF         | CEC0175   | 1    |
| C343   | C, AL ELYC  | 25 V    | 10      | UF NP      | CEC0176   | 1    |
| C344   | C, CERAMIC  | 50 V    | 10      | PF+-0.5PF  | CCC1002   | 1    |
| C345   | C, CERAMIC  | 50 V    | 47      | PF+-5%     | CCC1014   | 1    |
| C353   | C, CERAMIC  | 50 V    | 2       | PF+-0.25PF | CCC0996   | 1    |
| C354   | C, CERAMIC  | 50 V    | 1000    | PF+80%-20% | CCC1029   | 1    |
| C355   | C, CERAMIC  | 50 V    | 1000    | PF+80%-20% | CCC1029   | 1    |
| C357   | C, CERAMIC  | 50 V    | 10000   | PF+80%-20% | CCC1030   | 1    |
| C361   | C, CERAMIC  | 50 V    | 10000   | PF+80%-20% | CCC1030   | 1    |
| C366   | C, CERAMIC  | 50 V    | 680     | PF+-20%    | CCC1365   | 1    |
| C373   | C, CERAMIC  | 50 V    | 10000   | PF+80%-20% | CCC1030   | 1    |
| C376   | C, CERAMIC  | 50 V    | 10000   | PF+80%-20% | CCC1030   | 1    |
| C381   | C, CERAMIC  | 50 V    | 1000    | PF+80%-20% | CCC1029   | 1    |
| C383   | C, CERAMIC  | 500 V   | 10000   | PF+-10%    | CCD0218   | 1    |
| C389   | C, CERAMIC  | 500 V   | 1000    | PF         | CCC0590   | 1    |
| C391   | C, AL ELYC  | 160 V   | 1       | UF         | CEC0213   | 1    |
| C1034  | C, AL ELYC  | 160 V   | 1       | UF         | CEC0213   | 1    |
| C1035  | C, CERAMIC  | 500 V   | 10000   | PF+-10%    | CCD0218   | 1    |
| C1041  | C, CERAMIC  | 50 V    | 10000   | PF+80%-20% | CCC1030   | 1    |
| C1042  | C, CERAMIC  | 50 V    | 10000   | PF+80%-20% | CCC1030   | 1    |
| C1043  | C, CERAMIC  | 50 V    | 10000   | PF+80%-20% | CCC1030   | 1    |
| CV325  | C, VARIABLE | ECV-1ZW | 20 × 92 |            | H 3159319 | 1    |
| CV342  | C, VARIABLE | ECV-1ZW | 20 × 92 |            | H 3159319 | 1    |
| CV344  | C, VARIABLE | ECV-1ZW | 20 × 92 |            | H 3159319 | 1    |

| Simbol | Description |                |           |           | Code      | Q'ty |
|--------|-------------|----------------|-----------|-----------|-----------|------|
| D345   | DIODE       | 1S2268         |           |           | HDS0129   | 1    |
| D381   | DIODE       | HZ5B           | T-D       |           | HDH0029   | 1    |
| D1034  | DIODE       | HZ22           |           |           | HDH0072   | 1    |
| J384   | PIN         | FOR            | CONNECTOR |           | HX8193940 | 1    |
| J385   | PIN         | FOR            | CONNECTOR |           | HX8193940 | 1    |
| L337   | CORE        | L1-RH0303      |           |           | HX841221  | 1    |
| L338   | CORE        | L1-RH0303      |           |           | HX841221  | 1    |
| L384   | COIL        | T-COIL(3T, 7T) |           |           | H 8354946 | 1    |
| L385   | COIL        | T-COIL(3T, 7T) |           |           | H 8354946 | 1    |
| L389   | CORE        | L1-RH0303      |           |           | HX841221  | 1    |
| P323   | CONNECTOR   | 171826-6       |           |           | JBX1711   | 1    |
| P357   | CONNECTOR   | 171826-3       |           |           | JBX1710   | 1    |
| P380   | CONNECTOR   | 171826-3       |           |           | JBX1710   | 1    |
| P1038  | CONNECTOR   | 171826-6       |           |           | JBX1711   | 1    |
| PEF498 | PCB         | PEF-495        |           |           | H 116456  | R    |
| R313   | R, CARBON   | 1/4W           | 68        | OHM +-5%  | RCR3024   | 1    |
| R314   | R, CARBON   | 1/4W           | 68        | OHM +-5%  | RCR3024   | 1    |
| R319   | R, CARBON   | 1/4W           | 1.5       | KOHM +-5% | RCR3056   | 1    |
| R321   | R, METAL    | 1/4W           | 100       | OHM +-1%  | RME0652   | 1    |
| R322   | R, METAL    | 1/4W           | 100       | OHM +-1%  | RME0652   | 1    |
| R323   | R, CARBON   | 1/4W           | 3.3       | KOHM +-5% | RCR3064   | 1    |
| R324   | R, CARBON   | 1/4W           | 1.2       | KOHM +-5% | RCR3054   | 1    |
| R325   | R, CARBON   | 1/4W           | 100       | OHM +-5%  | RCR3028   | 1    |
| R326   | R, METAL    | 1/4W           | 82.5      | OHM +-1%  | RME0651   | 1    |
| R327   | R, METAL    | 1/4W           | 681       | OHM +-1%  | RME0662   | 1    |
| R328   | R, METAL    | 1/4W           | 681       | OHM +-1%  | RME0662   | 1    |
| R329   | R, CARBON   | 1/4W           | 390       | OHM +-5%  | RCR3042   | 1    |
| R330   | R, CARBON   | 1/4W           | 390       | OHM +-5%  | RCR3042   | 1    |
| R333   | R, METAL    | 1/4W           | 392       | OHM +-1%  | RME0659   | 1    |
| R334   | R, METAL    | 1/4W           | 392       | OHM +-1%  | RME0659   | 1    |



| Simbol | Description |      |      |           | Code    | Q'ty |
|--------|-------------|------|------|-----------|---------|------|
| R335   | R,METAL     | 1/4W | 3.32 | KOHM +-1% | RME0670 | 1    |
| R336   | R,METAL     | 1/4W | 1.21 | KOHM +-1% | RME0665 | 1    |
| R337   | R,METAL     | 1/4W | 100  | OHM +-1%  | RME0652 | 1    |
| R338   | R,METAL     | 1/4W | 100  | OHM +-1%  | RME0652 | 1    |
| R339   | R,CARBON    | 1/4W | 470  | OHM +-5%  | RCR3044 | 1    |
| R340   | R,CARBON    | 1/4W | 10   | OHM +-5%  | RCR3004 | 1    |
| R341   | R,METAL     | 1/4W | 71.5 | OHM +-1%  | RME0737 | 1    |
| R342   | R,CARBON    | 1/4W | 10   | OHM +-5%  | RCR3004 | 1    |
| R343   | R,CARBON    | 1/4W | 4.7  | KOHM +-5% | RCR3068 | 1    |
| R344   | R,CARBON    | 1/4W | 1.5  | KOHM +-5% | RCR3056 | 1    |
| R345   | R,CARBON    | 1/4W | 22   | KOHM +-5% | RCR3084 | 1    |
| R346   | R,METAL     | 1/4W | 825  | OHM +-1%  | RME0663 | 1    |
| R347   | R,METAL     | 1/4W | 825  | OHM +-1%  | RME0663 | 1    |
| R348   | R,CARBON    | 1/4W | 100  | OHM +-5%  | RCR3028 | 1    |
| R349   | R,CARBON    | 1/4W | 10   | OHM +-5%  | RCR3004 | 1    |
| R353   | R,CARBON    | 1/4W | 10   | OHM +-5%  | RCR3004 | 1    |
| R354   | R,CARBON    | 1/4W | 330  | OHM +-5%  | RCR3040 | 1    |
| R355   | R,CARBON    | 1/4W | 330  | OHM +-5%  | RCR3040 | 1    |
| R356   | R,CARBON    | 1/4W | 10   | OHM +-5%  | RCR3004 | 1    |
| R357   | R,CARBON    | 1/4W | 1.5  | KOHM +-5% | RCR3056 | 1    |
| R359   | R,CARBON    | 1/4W | 680  | OHM +-5%  | RCR3048 | 1    |
| R360   | R,CARBON    | 1/4W | 1.0  | KOHM +-5% | RCR3052 | 1    |
| R361   | R,METAL     | 1/4W | 82.5 | OHM +-1%  | RME0651 | 1    |
| R362   | R,METAL     | 1/4W | 82.5 | OHM +-1%  | RME0651 | 1    |
| R365   | R,METAL     | 1/4W | 82.5 | OHM +-1%  | RME0651 | 1    |
| R366   | R,CARBON    | 1/4W | 8.2  | KOHM +-5% | RCR3074 | 1    |
| R367   | R,METAL     | 1/4W | 619  | OHM +-1%  | RME0693 | 1    |
| R368   | R,METAL     | 1/4W | 619  | OHM +-1%  | RME0693 | 1    |
| R369   | R,METAL     | 1/4W | 619  | OHM +-1%  | RME0693 | 1    |
| R370   | R,METAL     | 1/4W | 619  | OHM +-1%  | RME0693 | 1    |

| Simbol | Description |          |      |           | Code      | Q'ty |
|--------|-------------|----------|------|-----------|-----------|------|
| R371   | R,METAL     | 1/4W     | 619  | OHM +-1%  | RME0693   | 1    |
| R372   | R,METAL     | 1/4W     | 619  | OHM +-1%  | RME0693   | 1    |
| R373   | R,METAL     | 1W       | 68   | OHM +-5%  | RMR2769   | 1    |
| R374   | R,METAL     | 1/4W     | 82.5 | OHM +-1%  | RME0651   | 1    |
| R375   | R,METAL     | 1/4W     | 47.5 | OHM +-1%  | RME0648   | 1    |
| R376   | R,METAL     | 1W       | 68   | OHM +-5%  | RMR2769   | 1    |
| R380   | R,CARBON    | 1/4W     | 10   | KOHM +-5% | RCR3076   | 1    |
| R381   | R,CARBON    | 1/4W     | 47   | OHM +-5%  | RCR3020   | 1    |
| R382   | R,CARBON    | 1/4W     | 10   | OHM +-5%  | RCR3004   | 1    |
| R383   | R,CARBON    | 1/4W     | 10   | OHM +-5%  | RCR3004   | 1    |
| R384   | R,CARBON    | 1/4W     | 150  | OHM +-5%  | RCR3032   | 1    |
| R385   | R,CARBON    | 1/4W     | 100  | OHM +-5%  | RCR3028   | 1    |
| R386   | R,CARBON    | 1/4W     | 47   | OHM +-5%  | RCR3020   | 1    |
| R387   | R,CARBON    | 1/4W     | 47   | OHM +-5%  | RCR3020   | 1    |
| R389   | R,METAL     | 5 W      | 390  | OHM +-5%  | RMR3257   | 1    |
| R390   | R,METAL     | 5 W      | 390  | OHM +-5%  | RMR3257   | 1    |
| R391   | R,CARBON    | 1/4W     | 10   | OHM +-5%  | RCR3004   | 1    |
| R1034  | R,CARBON    | 1/4W     | 100  | KOHM +-5% | RCR3100   | 1    |
| R1035  | R,CARBON    | 1/4W     | 1.0  | KOHM +-5% | RCR3052   | 1    |
| R1036  | R,CARBON    | 1/4W     | 6.8  | KOHM +-5% | RCR3072   | 1    |
| R1037  | R,CARBON    | 1/4W     | 220  | OHM +-5%  | RCR3036   | 1    |
| RT324  | THERMISTOR  | TMD1410H |      |           | H 8360551 | 1    |
| RT345  | THERMISTOR  | TMD1410H |      |           | H 8360551 | 1    |
| RV325  | VR,METAL    | CR19R B  | 100  | OHM       | RNC0005   | 1    |
| RV327  | VR,METAL    | CR19R B  | 220  | OHM       | RNC0030   | 1    |
| RV339  | VR,METAL    | CR19R B  | 1    | OHM       | RNC0003   | 1    |
| RV1035 | VR,METAL    | CR19R B  | 100  | KOHM      | RNC0012   | 1    |
| RV1038 | VR,METAL    | CR19R B  | 100  | KOHM      | RNC0012   | 1    |
| TR321  | TRANSISTOR  | 2SA800   |      |           | HTA0108   | 1    |
| TR322  | TRANSISTOR  | 2SA800   |      |           | HTA0108   | 1    |

| Simbol | Description |         | Code    | Q'ty |
|--------|-------------|---------|---------|------|
| TR329  | TRANSISTOR  | 2SC1906 | HTC0338 | 1    |
| TR330  | TRANSISTOR  | 2SC1906 | HTC0338 | 1    |
| TR337  | TRANSISTOR  | 2SC1747 | HTC0496 | 1    |
| TR338  | TRANSISTOR  | 2SC1747 | HTC0496 | 1    |
| TR353  | TRANSISTOR  | 2SC1747 | HTC0496 | 1    |
| TR355  | TRANSISTOR  | 2SC1747 | HTC0496 | 1    |
| TR361  | TRANSISTOR  | 2SC1252 | HTC0064 | 1    |
| TR362  | TRANSISTOR  | 2SC1252 | HTC0064 | 1    |
| TR383  | TRANSISTOR  | 2SC1252 | HTC0064 | 1    |
| TR386  | TRANSISTOR  | 2SC1252 | HTC0064 | 1    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-499)

| Simbol | Description |     |        |            | Code    | Q'ty |
|--------|-------------|-----|--------|------------|---------|------|
| C801   | C,CERAMIC   | 500 | V10000 | PF+-10%    | CCD0218 | 1    |
| C803   | C,CERAMIC   | 50  | V 2200 | PF+80%-20% | CCC1205 | 1    |
| C811   | C,CERAMIC   | 500 | V10000 | PF+-10%    | CCD0218 | 1    |
| C814   | C,CERAMIC   | 50  | V 220  | PF+-10%    | CCC1027 | 1    |
| C824   | C,AL ELYC   | 25  | V 10   | UF         | CEC0175 | 1    |
| C825   | C,CERAMIC   | 500 | V 0.5  | PF+-0.25PF | CCC0111 | 1    |
| C826   | C,CERAMIC   | 500 | V 0.5  | PF+-0.25PF | CCC0111 | 1    |
|        |             |     |        |            |         |      |
| C831   | C,CERAMIC   | 500 | V10000 | PF+-10%    | CCD0218 | 1    |
| C832   | C,CERAMIC   | 500 | V10000 | PF+-10%    | CCD0218 | 1    |
| C833   | C,CERAMIC   | 500 | V10000 | PF+-10%    | CCD0218 | 1'   |
| C843   | C,CERAMIC   | 500 | V10000 | PF+-10%    | CCD0218 | 1    |
| C845   | C,CERAMIC   | 50  | V 68   | PF+-5%     | CCC1034 | 1    |
| C846   | C,CERAMIC   | 50  | V 68   | PF+-5%     | CCC1034 | 1    |
| C891   | C,AL ELYC   | 25  | V 10   | UF         | CEC0175 | 1    |
| C1104  | C,PLASTIC   | 50  | V10000 | PF+-10%    | CQA0097 | 1    |
| C1105  | C,AL ELYC   | 160 | V 10   | UF         | CEC0214 | 1    |
| C1106  | C,PLASTIC   | 50  | V10000 | PF+-10%    | CQA0097 | 1    |
| C1110  | C,AL ELYC   | 100 | V 220  | UF         | CEC0211 | 1    |
| C1111  | C,AL ELYC   | 25  | V 2200 | UF         | CEC0347 | 1    |
| C1112  | C,CERAMIC   | 50  | V 220  | PF+-10%    | CCC1027 | 1    |
| C1113  | C,AL ELYC   | 16  | V 47   | UF         | CEC0170 | 1    |
| C1116  | C,AL ELYC   | 16  | V 47   | UF         | CEC0170 | 1    |
| C1121  | C,AL ELYC   | 25  | V 2200 | UF         | CEC0347 | 1    |
| C1124  | C,AL ELYC   | 16  | V 47   | UF         | CEC0170 | 1    |
| C1131  | C,AL ELYC   | 25  | V 2200 | UF         | CEC0347 | 1    |
| C1132  | C,AL ELYC   | 16  | V 47   | UF         | CEC0170 | 1    |
| C1142  | C,PLASTIX   | 50  | V 0.1  | UF+-10%    | CQA0103 | 1    |
| C1151  | C,AL ELYC   | 100 | V 220  | UF         | CEC0211 | 1    |

| Simbol | Description |               |              | Code      | Q'ty |
|--------|-------------|---------------|--------------|-----------|------|
| C1156  | C,AL ELYC   | 160 V         | 10 UF        | CEC0214   | 1    |
| C1161  | C,AL ELYC   | 25 V          | 1000 UF      | CEC0178   | 1    |
| D832   | DIODE       | HZ5B          | T-D          | HDH0029   | 1    |
| D1101  | DIODE       | M4C-1         |              | HDM0033   | 1    |
| D1103  | DIODE       | 1S2075        | T-D          | HDS0108   | 1    |
| D1104  | DIODE       | 1S2075        | T-D          | HDS0108   | 1    |
| D1105  | DIODE       | V06C          |              | HDV0019   | 1    |
| D1111  | DIODE       | M4C-1         |              | HDM0033   | 1    |
| D1114  | DIODE       | V06C          |              | HDV0019   | 1    |
| D1117  | DIODE       | HZ7BT-D       |              | HDH0040   | 1    |
| D1124  | DIODE       | V06C          |              | HDV0019   | 1    |
| D1131  | DIODE       | M4C-1         |              | HDM0033   | 1    |
| D1151  | DIODE       | V06C          |              | HDV0019   | 1    |
| D1152  | DIODE       | HZ22          |              | HDH0072   | 1    |
| D1153  | DIODE       | HZ22          |              | HDH0072   | 1    |
| D1155  | DIODE       | 1S2075        | T-D          | HDS0108   | 1    |
| D1156  | DIODE       | V06C          |              | HDV0019   | 1    |
| D1161  | DIODE       | V06C          |              | HDV0019   | 1    |
| D1162  | DIODE       | V06C          |              | HDV0019   | 1    |
| F1161  | FUSE        | MF61NM 1      | (1A 250V)JIS | EFG0344   | 1    |
| IC1104 | ANALOG IC   | HA17458GS     |              | ILH0054   | 1    |
| IC1111 | ANALOG IC   | HA17723G      |              | ILH0019   | 1    |
| IC1121 | IC          | FS-7912       |              | HX8338437 | 1    |
| IC1131 | IC          | HA17805P      |              | HX8338426 | 1    |
| J839   | PIN         | FOR CONNECTOR |              | HX8193940 | 1    |
| J840   | PIN         | FOR CONNECTOR |              | HX8193940 | 1    |
| P801   | CONNECTOR   | 171825-4      |              | JBX0704   | 1    |
| P811   | CONNECTOR   | 171825-6      |              | JBX0470   | 1    |
| P1101  | CONNECTOR   | 1-171825-0    |              | JBX0703   | 1    |
| P1104  | CONNECTOR   | 171825-6      |              | JBX0470   | 1    |

| Simbol | Description |            |      |           | Code     | Q'ty |
|--------|-------------|------------|------|-----------|----------|------|
| P1105  | CONNECTOR   | 171825-6   |      |           | JBX0470  | 1    |
| P1106  | CONNECTOR   | 171825-6   |      |           | JBX0470  | 1    |
| P1107  | CONNECTOR   | 1-171825-0 |      |           | JBX0703  | 1    |
| P1191  | CONNECTOR   | 171825-6   |      |           | JBX0470  | 1    |
| P1192  | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| PEF499 | PCB         | PEF-499    |      |           | H 116458 | 1    |
| R801   | R, METAL    | 1/4W       | 12.1 | KOHM +-1% | RME0677  | 1    |
| R802   | R, METAL    | 1/4W       | 12.1 | KOHM +-1% | RME0677  | 1    |
| R803   | R, CARBON   | 1/4W       | 2.2  | KOHM +-5% | RCR3060  | 1    |
| R804   | R, CARBON   | 1/4W       | 68   | OHM +-5%  | RCR3024  | 1    |
| R811   | R, METAL    | 1/4W       | 10.0 | KOHM +-1% | RME0676  | 1    |
| R812   | R, METAL    | 1/4W       | 10.0 | KOHM +-1% | RME0676  | 1    |
| R813   | R, METAL    | 1/4W       | 909  | OHM +-1%  | RME0714  | 1    |
| R814   | R, CARBON   | 1/4W       | 220  | KOHM +-5% | RCR3102  | 1    |
| R820   | R, CARBON   | 1/4W       | 220  | OHM +-5%  | RCR3036  | 1    |
| R821   | R, METAL    | 1/4W       | 1.21 | KOHM +-1% | RME0665  | 1    |
| R822   | R, METAL    | 1/4W       | 1.21 | KOHM +-1% | RME0665  | 1    |
| R823   | R, CARBON   | 1/4W       | 10   | KOHM +-5% | RCR3076  | 1    |
| R824   | R, CARBON   | 1/4W       | 33   | OHM +-5%  | RCR3016  | 1    |
| R825   | R, METAL    | 2 W        | 10   | KOHM +-5% | RMR2805  | 1    |
| R826   | R, METAL    | 2 W        | 10   | KOHM +-5% | RMR2805  | 1    |
| R827   | R, CARBON   | 1/4W       | 68   | OHM +-5%  | RCR3024  | 1    |
| R828   | R, CARBON   | 1/4W       | 68   | OHM +-5%  | RCR3024  | 1    |
| R829   | R, CARBON   | 1/4W       | 1.0  | KOHM +-5% | RCR3052  | 1    |
| R830   | R, CARBON   | 1/4W       | 1.0  | KOHM +-5% | RCR3052  | 1    |
| R831   | R, CARBON   | 1/4W       | 47   | KOHM +-5% | RCR3092  | 1    |
| R832   | R, CARBON   | 1/4W       | 2.2  | KOHM +-5% | RCR3060  | 1    |
| R833   | R, METAL    | 1/4W       | 392  | OHM +-1%  | RME0659  | 1    |
| R834   | R, METAL    | 1/4W       | 392  | OHM +-1%  | RME0659  | 1    |
| R835   | R, CARBON   | 1/4W       | 2.2  | KOHM +-5% | RCR3060  | 1    |

| Simbol | Description |         |      |           | Code      | Q'ty |
|--------|-------------|---------|------|-----------|-----------|------|
| R837   | R, METAL    | 2 W     | 10   | KOHM +-5% | RMR2805   | 1    |
| R838   | R, METAL    | 2 W     | 10   | KOHM +-5% | RMR2805   | 1    |
| R839   | R, CARBON   | 1/4W    | 330  | OHM +-5%  | RCR3040   | 1    |
| R840   | R, CARBON   | 1/4W    | 330  | OHM +-5%  | RCR3040   | 1    |
| R844   | R, CARBON   | 1/4W    | 100  | OHM +-5%  | RCR3028   | 1    |
| R845   | R, CARBON   | 1/4W    | 100  | OHM +-5%  | RCR3028   | 1    |
| R891   | R, CARBON   | 1/4W    | 220  | OHM +-5%  | RCR3036   | 1    |
| R1101  | R, CARBON   | 1/4W    | 10   | OHM +-5%  | RCR3004   | 1    |
| R1102  | R, CARBON   | 1/4W    | 15   | KOHM +-5% | RCR3080   | 1    |
| R1103  | R, CARBON   | 1/4W    | 1.0  | KOHM +-5% | RCR3052   | 1    |
| R1104  | R, CARBON   | 1/4W    | 10   | KOHM +-5% | RCR3076   | 1    |
| R1105  | R, METAL    | 1/4W    | 56.2 | KOHM +-1% | RME0685   | 1    |
| R1106  | R, METAL    | 1/4W    | 12.1 | KOHM +-1% | RME0677   | 1    |
| R1107  | R, CARBON   | 1/4W    | 10   | KOHM +-5% | RCR3076   | 1    |
| R1111  | R, SOLID    | M-2     | 0.47 | OHM +-5%  | RWM0146   | 1    |
| R1112  | R, METAL    | 1/4W    | 3.92 | KOHM +-1% | RME0671   | 1    |
| R1113  | R, METAL    | 1/4W    | 6.19 | KOHM +-1% | RME0729   | 1    |
| R1115  | R, METAL    | 1/4W    | 10.0 | KOHM +-1% | RME0676   | 1    |
| R1116  | R, CARBON   | 1/4W    | 1.0  | KOHM +-5% | RCR3052   | 1    |
| R1117  | R, CARBON   | 1/2W    | 4.7  | KOHM +-5% | RCR3175   | 1    |
| R1125  | R, METAL    | 1/4W    | 10.0 | KOHM +-1% | RME0676   | 1    |
| R1191  | R, CARBON   | 1/4W    | 1.0  | KOHM +-5% | RCR3052   | 1    |
| R1142  | R, CARBON   | 1/4W    | 470  | KOHM +-5% | RCR3104   | 1    |
| R1143  | R, CARBON   | 1/4W    | 4.7  | OHM +-5%  | RCR3068   | 1    |
| R1151  | R, CARBON   | 1/4W    | 10   | OHM +-5%  | RCR3004   | 1    |
| R1152  | R, CARBON   | 1/4W    | 10   | KOHM +-5% | RCR3076   | 1    |
| RV804  | VR, METAL   | CR19R B | 100  | OHM       | H RNC0005 | 1    |

| Simbol | Description |           |     |      | Code      | Q'ty |
|--------|-------------|-----------|-----|------|-----------|------|
| RV811  | VR,METAL    | CR19R B   | 4.7 | KOHM | H RNC0031 | 1    |
| RV813  | VR,METAL    | CR19R B   | 470 | OHM  | H RNC0002 | 1    |
| RV1112 | VR,METAL    | CR19R B   | 1   | KOHM | RNC0003   | 1    |
| TR801  | TRANSISTOR  | 2SA781K   |     |      | HTA0099   | 1    |
| TR802  | TRANSISTOR  | 2SA781K   |     |      | HTA0099   | 1    |
| TR811  | TRANSISTOR  | 2SA781K   |     |      | HTA0099   | 1    |
| TR812  | TRANSISTOR  | 2SA781K   |     |      | HTA0099   | 1    |
| TR825  | TRANSISTOR  | 2SC1906   |     |      | HTC0338   | 1    |
| TR828  | TRANSISTOR  | 2SC1906   |     |      | HTC0338   | 1    |
| TR831  | TRANSISTOR  | 2SD668A-C |     |      | HTD0100   | 1    |
| TR832  | TRANSISTOR  | 2SD668A-C |     |      | HTD0100   | 1    |
| TR833  | TRANSISTOR  | 2SB648A-C |     |      | HTB0087   | 1    |
| TR834  | TRANSISTOR  | 2SB648A-C |     |      | HTB0087   | 1    |
| TR836  | TRANSISTOR  | 2SC1906   |     |      | HTC0338   | 1    |
| TR837  | TRANSISTOR  | 2SC1906   |     |      | HTC0338   | 1    |
| TR1101 | TRANSISTOR  | 2SD478C   |     |      | HTD0053   | 1    |
| TR1102 | TRANSISTOR  | 2SD478C   |     |      | HTD0053   | 1    |
| TR1111 | TRANSISTOR  | 2SD478C   |     |      | HTD0053   | 1    |
| TR1151 | TRANSISTOR  | 2SD478C   |     |      | HTD0053   | 1    |
| TR1191 | TRANSISTOR  | 2SC458C   |     |      | HTC0148   | 1    |
| TR1192 | TRANSISTOR  | 2SC1061C  |     |      | HTC0032   | 1    |



# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-500)

| Simbol  | Description |                         |        |            | Code     | Q'ty |
|---------|-------------|-------------------------|--------|------------|----------|------|
| CI201   | C,AL ELYC   | 16                      | V 47   | MF         | CEC0170  | 1    |
| CI202   | C,CERAMIC   | 50                      | V10000 | PF+80%-20% | CCC1030  | 1    |
| CI203   | C,PLASTIC   | 50                      | V22000 | PF+-10%    | CQA0099  | 1    |
| CI205   | C,CERAMIC   | 50                      | V 220  | PF+-10%    | CCC1027  | 1    |
| CI206   | C,CERAMIC   | 50                      | V 100  | PF+-10%    | CCC1025  | 1    |
| CI209   | C,AL ELYC   | 16                      | V 47   | MF         | CEC0170  | 1    |
| CI303   | C,AL ELYC   | 25                      | V 10   | MF         | CEC0175  | 1    |
| CI304   | C,AL ELYC   | 25                      | V 10   | MF         | CEC0175  | 1    |
| DI301   | DIODE       | HZ7BT-D                 |        |            | HDH0040  | 1    |
| DI302   | DIODE       | HZ7BT-D                 |        |            | HDH0040  | 1    |
| DI303   | DIODE       | 1S2075                  | T-D    |            | HDS0108  | 1    |
| DI304   | DIODE       | 1S2075                  | T-D    |            | HDS0108  | 1    |
| DI401   | DIODE       | SR503D WITH MOUNT (RED) |        |            | HDS0408  | 1    |
| ICI201  | IC          | HA17555GS               |        |            | ILH0063  | 1    |
| ICI202  | DIGITAL IC  | MC14011BCP              |        |            | IDM0169  | 1    |
| LI208   | COIL        | FL-5H 330K              |        |            | TLF0019  | 1    |
| PI201   | CONNECTOR   | 171826-3                |        |            | JBX1710  | 1    |
| PI202   | CONNECTOR   | 171825-3                |        |            | JBX0468  | 1    |
| PI203   |             |                         |        |            |          |      |
| PI302   | CONNECTOR   | 171826-3                |        |            | JBX1710  | 1    |
| PI303   | CONNECTOR   | 171826-6                |        |            | JBX1711  | 1    |
| PEF-500 | PCB         | PEF-499                 |        |            | H 116458 | R    |
| RI201   | R,CARBON    | 1/4W                    | 10     | KOHM +-5%  | RCR3076  | 1    |
| RI202   | R,CARBON    | 1/4W                    | 22     | OHM +-5%   | RCR3012  | 1    |
| RI203   | R,METAL     | 1/4W                    | 6.81   | KOHM +-1%  | RME0674  | 1    |
| RI204   | R,METAL     | 1/4W                    | 22.1   | KOHM +-1%  | RME0680  | 1    |
| RI205   | R,METAL     | 1/4W                    | 10.0   | KOHM +-1%  | RME0676  | 1    |
| RI206   | R,METAL     | 1/4W                    | 475    | OHM +-1%   | RME0660  | 1    |
| RI207   | R,CARBON    | 1/4W                    | 1.0    | KOHM +-5%  | RCR3052  | 1    |
| RI208   | R,CARBON    | 1/4W                    | 22     | OHM +-5%   | RCR3012  | 1    |

| Simbol | Description |       |                     |           | Code      | Q'ty |
|--------|-------------|-------|---------------------|-----------|-----------|------|
| R1209  | R, CARBON   | 1/4W  | 22                  | KOHM +-5% | RCR3084   | 1    |
| R1302  | R, CARBON   | 1/4W  | 1.0                 | KOHM +-5% | RCR3052   | 1    |
| R1303  | R, CARBON   | 1/4W  | 4.7                 | KOHM +-5% | RCR3068   | 1    |
| R1304  | R, CARBON   | 1/4W  | 4.7                 | KOHM +-5% | RCR3068   | 1    |
| R1401  | R, CARBON   | 1/4W  | 1.0                 | KOHM +-5% | RCR3052   | 1    |
| RV1203 | VR, METAL   | CR29R | 10                  | KOHM      | HX8348450 | 1    |
| RV1205 | VR, METAL   | CR29R | 2.2                 | KOHM      | HX8348450 | 1    |
| RV1301 | VR, CARBON  | 1/2W  | 2×10KOHM+-20%(DPST) |           | HX3159314 | 1    |
| RV1302 | VR, CARBON  | TYPE  | 10KB+10KB           |           | HX3142092 | 1    |
| RV1303 | VR, CARBON  | TYPE  | 10KB+10KB           |           | HX3142092 | 1    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-501)

| Simbol | Description |                           |  | Code      | Q'ty |
|--------|-------------|---------------------------|--|-----------|------|
| P547   | CONNECTOR   | 171826-3                  |  | JBX1710   | 1    |
| P562   | CONNECTOR   | 1-171826-2                |  | JBX1713   | 1    |
| PEF501 | PCB         | PEF-495                   |  | H 116456  | R    |
| R880   | R, CARBON   | 1/4W 100 OHM +-5%         |  | RCR3028   | 1    |
| R881   | R, CARBON   | 1/4W 15 KOHM +-5%         |  | RCR3080   | 1    |
| R882   | R, CARBON   | 1/4W 100 OHM +-5%         |  | RCR3028   | 1    |
| RV298  | VR, CARBON  | EWK-ENAP20B14 (10K+10K)   |  | H 3159318 | 1    |
| RV552  | VR, CARBON  | TYPE 16 10KB+50KB WITH/SW |  | HX3142080 | 1    |
| S357   | SW, PUSH    | UEG22-2                   |  | HX8311793 | 1    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-502)

| Simbol | Description |                |  | Code      | Q'ty |
|--------|-------------|----------------|--|-----------|------|
| PL1401 | LAMP        | SCALE 14V 80MA |  | HX8329332 | 1    |
| PL1402 | LAMP        | SCALE 14V 80MA |  | HX8329332 | 1    |
| PL1403 | LAMP        | SCALE 14V 80MA |  | HX8329332 | 1    |
| PEF502 | PCB         | PEF-499        |  | H 116458  | R    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-503)

| Simbol  | Description                  | Code     | Q'ty |
|---------|------------------------------|----------|------|
| C1030   | C, CERAMIC 50 V 100 PF+-10%  | CCC1025  | 1    |
| J1011   | SOCKET PS-085                | JSP0001  | 1    |
| PEF-503 | PCB PEF-499                  | H 116458 | R    |
| R1030   | R, CARBON 1/4W 4.7 KOHM +-5% | RCR3068  | 1    |
| R1031   | R, CARBON 1/4W 100 KOHM +-5% | RCR3100  | 1    |
| R1033   | R, CARBON 1/4W 100 OHM +-5%  | RCR3028  | 1    |
| R1035   | R, CARBON 1/4W 100 OHM +-5%  | RCR3028  | 1    |

# ELECTRICAL REPLACEABLE PARTS LIST

## CIRCUIT BOARD (PEF-504)

| Simbol  | Description |              |     |       |            | Code      | Q'ty |
|---------|-------------|--------------|-----|-------|------------|-----------|------|
| C905    | C,CERAMIC   | 500          | V   | 0.5   | PF+-0.25PF | CCC0111   | 1    |
| C906    | C,CERAMIC   | 50           | V   | 15    | PF+-5%     | CCC1004   | 1    |
| C910    | C,AL ELYC   | 25           | V   | 10    | MF         | CEC0175   | 1    |
| C912    | C,CERAMIC   | 500          | V   | 10000 | PF+-10%    | CCD0218   | 1    |
| C913    | C,CERAMIC   | 500          | V   | 10000 | PF+-10%    | CCD0218   | 1    |
| C914    | C,CERAMIC   | 50           | V   | 220   | PF+-10%    | CCC1027   | 1    |
| C1001   | C,PLASTIC   | 50           | V   | 47000 | PF+-10%    | CQA0101   | 1    |
| C1006   | C,PLASTIC   | 50           | V   | 47000 | PF+-10%    | CQA0101   | 1    |
| C1010   | C,CERAMIC   | 500          | V   | 1000  | PF+-10%    | CCD0217   | 1    |
| C1011   | C,CERAMIC   | 2000         | V   | 4700  | PF+-10%    | CCD0221   | 1    |
| C1012   | C,CERAMIC   | 2000         | V   | 4700  | PF+-10%    | CCD0221   | 1    |
| C1013   | C,AL ELYC   | 160          | V   | 1     | UF         | CEC0213   | 1    |
| C1020   | C,CERAMIC   | 2000         | V   | 4700  | PF+-10%    | CCD0221   | 1    |
| C1021   | C,CERAMIC   | 2000         | V   | 4700  | PF+-10%    | CCD0221   | 1    |
| C1028   | C,CERAMIC   | 500          | V   | 10000 | PF+-10%    | CCD0218   | 1    |
| C1031   | C,CERAMIC   | 2000         | V   | 100   | PF+-10%    | CCC1207   | 1    |
| C1161   | C,AL ELYC   | 25           | V   | 100   | UF         | CEC0177   | 1    |
| D903    | DIODE       | 1SS88        |     |       |            | HDS0415   | 1    |
| D904    | DIODE       | 1S2075       | T-D |       |            | HDS0108   | 1    |
| D911    | DIODE       | 1S2075       | T-D |       |            | HDS0108   | 1    |
| D1001   | DIODE       | 1S2075       | T-D |       |            | HDS0108   | 1    |
| D1010   | DIODE       | 1SS83        |     |       |            | HDS0250   | 1    |
| D1011   | DIODE       | 1SS83        |     |       |            | HDS0250   | 1    |
| D1012   | DIODE       | 1SS83        |     |       |            | HDS0250   | 1    |
| D1020   | DIODE       | Y10GA        |     |       |            | HDY0031   | 1    |
| D1021   | DIODE       | 1SS83        |     |       |            | HDS0250   | 1    |
| D1028   | DIODE       | Y10GA        |     |       |            | HDY0031   | 1    |
| D1040   | DIODE       | HZ22         |     |       |            | HDH0072   | 1    |
| IC1001  | IC,ANALOG   | TL071CP      |     |       |            | ILT0041   | 1    |
| MUT1001 | MULTIPLIER  | 17KV W/ANODE | CAP |       |            | H 3142144 | 1    |

| Simbol  | Description |            |      |           | Code     | Q'ty |
|---------|-------------|------------|------|-----------|----------|------|
| NL1031  | LAMP        | NE-2       |      |           | ELL0019  | 1    |
| NL1032  | LAMP        | NE-2       |      |           | ELL0019  | 1    |
| P901    | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| P902    | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| P1001   | CONNECTOR   | 1-171825-0 |      |           | JBX0703  | 1    |
| P1002   | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| P1021   | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| P1022   | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| P1023   | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| P1401   | CONNECTOR   | 171825-3   |      |           | JBX0468  | 1    |
| PEF-504 | PCB         | PEF-499    |      |           | H 116458 | R    |
| PEF531  | PCB         | PEF-499    |      |           | H 116458 | R    |
| R901    | R, CARBON   | 1/4W       | 3.3  | KOHM +-5% | RCR3064  | 1    |
| R902    | R, CARBON   | 1/4W       | 15   | KOHM +-5% | RCR3080  | 1    |
| R903    | R, METAL    | 1/4W       | 2.21 | KOHM +-1% | RME0668  | 1    |
| R904    | R, METAL    | 1/4W       | 15.0 | KOHM +-1% | RME0678  | 1    |
| R905    | R, METAL    | 1 W        | 15   | KOHM +-5% | RMR2783  | 1    |
| R906    | R, CARBON   | 1/4W       | 3.3  | KOHM +-5% | RCR3064  | 1    |
| R907    | R, CARBON   | 1/4W       | 100  | KOHM +-5% | RCR3100  | 1    |
| R908    | R, CARBON   | 1/4W       | 1.0  | KOHM +-5% | RCR3052  | 1    |
| R909    | R, CARBON   | 1/4W       | 47   | OHM +-5%  | RCR3020  | 1    |
| R910    | R, CARBON   | 1/4W       | 68   | KOHM +-5% | RCR3096  | 1    |
| R911    | R, CARBON   | 1/4W       | 12   | KOHM +-5% | RCR3078  | 1    |
| R912    | R, METAL    | 1/4W       | 1.00 | KOHM +-1% | RME0664  | 1    |
| R913    | R, METAL    | 1 W        | 15   | KOHM +-5% | RMR2783  | 1    |
| R915    | R, CARBON   | 1/4W       | 220  | OHM +-5%  | RCR3036  | 1    |
| R916    | R, METAL    | 1/4W       | 6.81 | KOHM +-1% | RME0674  | 1    |
| R917    | R, CARBON   | 1/4W       | 10   | OHM +-5%  | RCR3004  | 1    |
| R918    | R, CARBON   | 1/4W       | 470  | OHM +-5%  | RCR3044  | 1    |
| R919    | R. CARBON   | 1/4W       | 100  | OHM +-5%  | RCR3028  | 1    |

| Simbol | Description |                             |     |           | Code      | Q'ty |
|--------|-------------|-----------------------------|-----|-----------|-----------|------|
| R920   | R, CARBON   | 1/4W                        | 82  | KOHM +-5% | RCR3098   | 1    |
| R921   | R, CARBON   | 1/4W                        | 220 | OHM +-5%  | RCR3036   | 1    |
| R1001  | R, METAL    | 1/4W                        | 619 | KOHM +-1% | RME0825   | 1    |
| R1002  | R, CARBON   | 1/4W                        | 3.3 | KOHM +-5% | RCR3064   | 1    |
| R1003  | R, CARBON   | 1/4W                        | 1.0 | KOHM +-5% | RCR3052   | 1    |
| R1004  | R, CARBON   | 1/4W                        | 100 | KOHM +-5% | RCR3100   | 1    |
| R1005  | R, CARBON   | 1/4W                        | 1.0 | KOHM +-5% | RCR3052   | 1    |
| R1006  | R, CARBON   | 1/4W                        | 10  | OHM +-5%  | RCR3004   | 1    |
| R1010  | R, CARBON   | 1/4W                        | 330 | KOHM +-5% | RCR3103   | 1    |
| R1011  | R, CARBON   | 1/4W                        | 220 | OHM +-5%  | RCR3036   | 1    |
| R1012  | R, CARBON   | 1/4W                        | 33  | OHM +-5%  | RCR3016   | 1    |
| R1020  | R, CARBON   | 1/4W                        | 4.7 | KOHM +-5% | RCR3068   | 1    |
| R1021  | R, SOLID    | 1/4W                        | 10  | MOHM +-5% | RSE0434   | 1    |
| R1022  | R, CARBON   | 1/2W                        | 2.7 | MOHM +-5% | RCR3480   | 1    |
| R1023  | R, CARBON   | 1/2W                        | 2.7 | MOHM +-5% | RCR3480   | 1    |
| R1024  | R, CARBON   | 1/2W                        | 2.7 | MOHM +-5% | RCR3480   | 1    |
| R1025  | R, CARBON   | 1/2W                        | 2.7 | MOHM +-5% | RCR3480   | 1    |
| R1027  | R, CARBON   | 1/4W                        | 1   | MOHM +-5% | RCR3106   | 1    |
| R1028  | R, CARBON   | 1/4W                        | 1.0 | KOHM +-5% | RCR3052   | 1    |
| R1031  | R, METAL    | 1 W                         | 22  | MOHM +-1% | HX3142076 | 1    |
| RV1040 | VR, METAL   | CR29R                       | 100 | KOHM      | HX8348450 | 1    |
| T1001  | XFMR        | HIGH VOLTAGE XFMR FOR V1050 |     |           | H 3142143 | 1    |
| TR903  | TRANSISTOR  | 2SC641K-C                   |     |           | HTC0192   | 1    |
| TR909  | TRANSISTOR  | 2SC1906                     |     |           | HTC0338   | 1    |
| TR911  | TRANSISTOR  | 2SB648A-C                   |     |           | HTB0087   | 1    |
| TR912  | TRANSISTOR  | 2SD668A-C                   |     |           | HTD0100   | 1    |
| TR920  | TRANSISTOR  | 2SA778AK                    |     |           | HTA0104   | 1    |
| TR921  | TRANSISTOR  | 2SA781K                     |     |           | HTA0099   | 1    |
| TR1006 | TRANSISTOR  | 2SC1061C                    |     |           | HTC0032   | 1    |

## ELECTRICAL REPLACEABLE PARTS LIST CABINET

| Simbol | Description |                            | Code      | Q'ty |
|--------|-------------|----------------------------|-----------|------|
| F1401  | FUSE        | MF61NM 2 (2A 250 V)JIS     | EFG0352   | 1    |
| FH1401 | TERMINAL    | S-17221 (100/120/220/240V) | HX3142147 | 1    |
| L1401  | COIL        | V-550                      | HX3142116 | 1    |
| J1410  | CONNECTOR   | CM3 (C-170)                | JJC0026   | 1    |
| RV551  | VR,WIRE     | MF220D 2KOHM               | RXM0009   | 1    |
| RV1401 | VR,CARBON   | EVM-R7GS20B26              | RDE0028   | 1    |
| TP1401 | TERMINAL    | BLK                        | HX4114183 | 1    |
| TP1402 | TERMINAL    | Z-048                      | HX8338351 | 1    |
| T1401  | XFMR        | POWER XFMR FOR V-1050      | H 3159329 | 1    |
| V1401  | CRT         | 150BNB31                   | H 3159317 | 1    |



## MECHANICAL REPLACEABLE PARTS LIST

| Symbol | Description      | Code       | Q'ty | Remarks |
|--------|------------------|------------|------|---------|
| 1      | Cover            | 288054-A   | 1    |         |
| 2      | Cover, bottom    | 3149269-A  | 1    |         |
| 3      | Chassis, front   | 117473-AA  | 1    |         |
| 4      | Chassis, rear    | 294969-AA  | 1    |         |
| 5      | Chassis          | 294970-A   | 1    |         |
| 6      | Angle            | 3149270-A  | 1    |         |
| 7      | Angle            | 3149271-AA | 1    |         |
| 8      | Angle            | 3159618-AA | 1    |         |
| 9      | Angle            | 3149273-AA | 1    |         |
| 11     | CRT band         | 3159619-A  | 2    |         |
| 12     | Plate, shield    | 3159620-A  | 1    |         |
| 13     | Bracket, support | 8338296-A  | 1    |         |
| 14     | Bracket, PEF498  | 8353484-A  | 1    |         |
| 15     | Bracket, PEF499  | 3159621-A  | 1    |         |
| 16     | Bracket          | 8330677-A  | 1    |         |
| 17     | Plate, shield    | 8330678-A  | 1    |         |
| 18     | Bracket, LSW     | 3159622-A  | 1    |         |
| 19     | Bracket, LSW     | 8353485-A  | 1    |         |
| 20     | Bracket, LSW     | 8353486-A  | 1    |         |
| 21     | Plate, shield    | 8338330-A  | 1    |         |
| 22     | HV case          | 8353487-AA | 1    |         |
| 23     | Plate            | 8330684-A  | 1    |         |
| 24     | Plate            | 3149278-A  | 2    |         |
| 26     | Plate, shield    | 8364165-A  | 1    |         |
| 27     | Plate, earth     | 8360706-A  | 2    |         |
| 28     | Bracket, MD      | 8345458-A  | 1    |         |
| 29     | Heat sink        | 8355595-A  | 1    |         |
| 30     | Chassis, PEF504  | 8353489-A  | 1    |         |
| 32     | Spacer, BNC      | 8360673-A  | 2    |         |
| 41     | Screw Plate      | 8345476-A  | 2    |         |

| Symbol | Description  | Code         | Q'ty | Remarks  |
|--------|--------------|--------------|------|--|
| 51     | Shield band  | 8316268-B    | 1    | B-312-250<br>PS-4N(6.4H)<br><br>AT<br>BT<br>S18<br>S24<br>URV<br>S18B<br>0022<br>LSW<br>S18B-N<br>SER.No.<br>No.1027<br>No.113 |
| 52     | Shield case  | 3159625-A    | 1    |  |
| 53     | Handle       | 3156107-A    | 1    |  |
| 54     | Lock, handle | 8345467-A    | 2    |  |
| 56     | Panel, front | 294971-B     | 1    |  |
| 57     | Panel, rear  | 3159623~24-A | 1    |  |
| 59     | Bezel        | 288060-A     | 1    |  |
| 60     | Cover, side  | 3149315-A    | 2    |  |
| 62     | Foot, rear   | 3149317-A    | 4    |  |
| 63     | Foot         | 3140755-A    | 4    |  |
| 64     | Bush         | ERR0073      | 1    |  |
| 65     | Spacer       | Xci0097      | 2    |  |
| 66     | Filter       | 3149318-A    | 1    |  |
| 67     | Plate        | 8353491-A    | 1    |  |
| 68     | Plate        | 8364166-A    | 1    |  |
| 69     | Rubber       | 8322428-B    | 1    |  |
| 71     | Cushion      | 8330711-B    | 2    |  |
| 72     | Cushion      | 8330711-F    | 1    |  |
| 73     | Knob         | 3149319-A    | 1    |  |
| 74     | Knob         | 3149320-A    | 1    |  |
| 75     | Knob         | 3149321-A    | 6    |  |
| 76     | Knob         | 3149322-B    | 1    |  |
| 77     | Knob         | 3149323-A    | 2    |  |
| 78     | Knob         | 3149324-A    | 4    |  |
| 79     | Knob         | 3122685-D    | 2    |  |
| 80     | Knob         | 3149325-B    | 6    |  |
| 81     | Knob         | 3149324-B    | 1    |  |
| 82     | Label        | 8316162-A    | 1    |  |
| 83     | Rivet        | 8340163-B    | 4    |  |
| 84     | Rivet        | 8340164-A    | 4    |  |

| Symbol | Description        | Code      | Q'ty | Remarks   |
|--------|--------------------|-----------|------|-----------|
| 85     | Support            | 8360723-A | 10   | LCBS-3NS  |
| 86     | Support            | 8360723-G | 4    | LCBS-14NS |
| 87     | Bush               | 8340166-A | 1    | CE-012    |
| 88     | Bush               | ERR0010   | 1    | CSG-012   |
| 91     | Knob               | 8353492-A | 1    | P         |
| 92     | Rubber             | 8353493-A | 1    |           |
| 93     | Rubber             | 8353494-A | 2    |           |
| 94     | Band               | 8353501-G | 1    |           |
| 95     | Guide, cable       | 8353502-A | 2    | No.249    |
| 96     | Guide, cable       | 8353502-B | 1    | No.1219   |
| 98     | Label, HV caution  | 849085    | 1    |           |
| 301    | Screw, sems (Sw·w) | XCA0661   | 14   | M3 × 8    |
| 302    | Screw, sems (Sw)   | XCA1319   | 6    | M4 × 12   |
| 303    | Screw, sems (Sw·w) | 8340167-C | 4    | M4 × 20   |
| 306    | Screw              | XCA6205   | 7    | M2 × 5    |
| 307    | Screw              | XCA6306   | 6    | M3 × 6    |
| 308    | Screw              | XCA6308   | 27   | M3 × 8    |
| 309    | Screw              | XCA6312   | 9    | M3 × 12   |
| 311    | Screw              | XCA6410   | 4    | M4 × 10   |
| 313    | Screw, black       | XCA1820   | 4    | M3 × 10   |
| 318    | Screw              | XCA0782   | 4    | M2.6 × 4  |
| 316    | Screw, flat        | XCA7306   | 28   | M3 × 6    |
| 401    | Washer, spring     | XCA1879   | 8    | M3        |
| 402    | Washer, spring     | XCA1881   | 2    | M4        |
| 403    | Washer             | XCA1855   | 8    | M3        |
| 404    | Washer             | XCA1857   | 2    | M4        |
| 405    | Nut                | XCA1706   | 8    | M3        |
| 406    | Nut                | XCA1707   | 2    | M4        |